

**BIOGRAPHY AND BIBLIOGRAPHY**

As of: 3/6/09

**Personal**

Terry Clyde Hazen

Born: February 7, 1951 Pontiac, Michigan

Married: June 12, 1972 to Gayle Kanne Reinecke (textiles retailing, library resources, marketing)

2 children: Tracy Heather (26 years), Brooks Trevor (23 years)

Hobbies: photography, SCUBA diving (Nitrox certified), flying (licensed private pilot), handicrafts, and sailing



Business Address: Lawrence Berkeley National Laboratory  
Center for Environmental Biotechnology  
Virtual Institute for Microbial Stress & Survival  
Ecology Department  
Earth Sciences Division  
University of California  
MS 70A-3317, One Cyclotron Road  
Berkeley, CA  
Phone: (510) 486-6223, Fax: -7152  
Email: [tchazen@lbl.gov](mailto:tchazen@lbl.gov)

Home Address: 2983 Rustle Court  
Fairfield, CA 94534  
Cell Phone: (707) 631-6763  
Email: [terrychazen@comcast.net](mailto:terrychazen@comcast.net)

**Education**

Michigan State University, East Lansing, Michigan, 1969-74

Bachelor of Science with honor, 1973

Major: Interdepartmental Biology

Master of Science, 1974

Major: Interdepartmental Biology

Specialty: Parasitology

Wake Forest University, Winston-Salem, North Carolina, 1975-8

Doctor of Philosophy, 1978

Major: Parasitology-Ecology

Minor: Microbiology-Immunology

Special Skills: Electron Microscopy (Transmission and Scanning), Computer Programming

*Special Training and Certificates*

Advanced Media (TV & newspaper interviews) 30 hrs.

Flow Cytometry 40 hrs.

Bioremediation 16 hrs.

HAZTRAIN 40 hrs.

HAZTRAIN (Supervisor) 8 hrs.

Quality Assurance 40 hrs.

Fire Warden 3 hrs.

DNA analysis 16 hrs.  
 Field Property Administrator 8 hrs.  
 Subcontract Technical Representative 16 hrs.  
 Geologic Modeling of Depositional Environments 24 hrs.  
 Laser Safety Training 4 hrs.  
 Authorized Derivative Classifier 12 hrs.  
 Principle Centered Leadership Training 16 hrs.  
 Myers/Briggs Training 16 hrs.  
 CPR and First Aid 8 hrs.

### **Professional, Teaching, and Research Experience**

Senior Staff Scientist, Earth Sciences Division, Lawrence Berkeley National Laboratory, University of California, 2003-present.

Director, Microbial Communities Division, Joint BioEnergy Institute, Lawrence Berkeley National Laboratory. 2007-present.

Co-Director, Virtual Institute for Microbial Stress and Survival, Lawrence Berkeley National Laboratory. 2002-present.

Head, Center for Environmental Biotechnology, Lawrence Berkeley National Laboratory, University of California, 1999-present.

Head, Ecology Department (Microbial Ecology & Environmental Engineering Department), Lawrence Berkeley National Laboratory, University of California, 1998-present.

Lead, Environmental Remediation Technology Program, Lawrence Berkeley National Laboratory, University of California, 1998-2003.

Member Lead-Lab Council, Subsurface Contaminant Focus Area, USDOE Environmental Management, 1999-2002.

Chairman, Field Research Review Panel, USDOE Natural and Accelerated Bioremediation Program, 1999-2007.

Member, Oakland USDOE Site Technology Coordination Group, 1998-2002.

Member, Bay Area Defense Conversion Action Team (BADCAT), 1998-2002.

Member, USDOE EM Strategic Laboratory Council, 1998-2003.

Member, California Environmental Business Council, 1998-2000.

Environmental Remediation Technology Department, Head, Lawrence Berkeley National Laboratory, University of California, 1998-1998.

Staff Scientist, Earth Sciences Division, Lawrence Berkeley National Laboratory, University of California, 1998-2003.

Environmental Biotechnology Section Manager, Savannah River Technology Center, Westinghouse Savannah River Company, 1996-1998.

Biotechnology Group Manager, Savannah River Technology Center, Westinghouse Savannah River Company, 1995-1996.

Biotechnology Group Leader, Westinghouse Savannah River Company, Savannah River Technology Center, 1993-1995.

Member USDOE Biotechnology Interlaboratory Council, 1994-1998, 1999-2005

Member SRS Engineering Council, 1993-1998.

Fellow Scientist, Westinghouse Savannah River Company, Savannah River Technology Center, 1993-1998.

Principal Scientist, Westinghouse Savannah River Company, Savannah River Laboratory, 1989-1993.

Scientist, E. I. DuPont de Nemours and Company, Savannah River Laboratory, 1987-1989.

Chairman, USDOE Ad-Hoc Panel on Bioremediation, In Situ Integrated Program, Office of Technology Development, 1989-1994.

Honorary Professor, Guangdong Institute of Microbiology, Guangzhou, China. 2008-Present.

Honorary Professor, Central South University, Changsha, China. 2006-Present.

Adjunct Professor, Department of Biology, George Mason University, Virginia. 2001-Present.

Adjunct Professor, Department of Microbiology, University of Georgia, Athens, Georgia. 1997-Present.

Adjunct Professor, Department of Civil and Environmental Engineering, Utah State University, Logan, Utah, 1989-Present.

Adjunct Associate Professor, Department of Biology, University of South Carolina, Columbia, SC, 1988-Present.

Adjunct Professor, Department of Biology, Wake Forest University, Winston-Salem, North Carolina, 1988-Present.

Adjunct Professor, Department of Biology, University of Puerto Rico, Río Piedras, Puerto Rico, 1988-Present.

Adjunct Professor of Marine Sciences, Department of Marine Sciences, University of Puerto Rico at Mayagüez 1980-Present.

Professor, University of Puerto Rico, Río Piedras, Puerto Rico, 1985-8.

Associate Professor, University of Puerto Rico, Río Piedras, Puerto Rico, 1982-5.

Assistant Professor, University of Puerto Rico, Río Piedras 1979-82.

Graduate Student Advisor 1982-4.

Committees: Graduate (Chairman 1980-4) 1980-4, Recruitment 1980-2 (Chairman 1981-2), Personnel (Chairman 1985-7) 1985-7, Library 1979-84, MARC-Steering 1979-84, Microbiology Study 1980-4, Math Study 1981, Ph. D. Steering 1982-7 (Chairman 1983-5), Faculty Computer 1984-7, Delegate for UPR to the National Association of State Universities and Land Grant Colleges 1982, Special Emphasis Sub-Committee for Graduate Studies UPR Río Piedras Campus 1983, Faculty Advisor to BetaBetaBeta 1984-7, MBRS Advisory Committee 1985-7, Advisory Committee Medical Campus NIH-RCMI Program for the University of Puerto Rico 1985-7, Search Committee for Dean of Natural Sciences 1986, Curriculum evaluation 1985-6.

Advisory Committee NSF-EPSCOR in Puerto Rico 1985-7

Interim Chairman of the Department of Biology 1984-5.

Protagonist, University of Puerto Rico, Río Piedras campus. PROPHET Computer Network, NIH Biotechnology Resources Program, Division of Research Resources. 1983-7.

Consultant in Computer Assisted Instruction, University of Puerto Rico National Science Foundation CAUSE Grant 1979-82.

Consultant to La Famosa Food Industries, San Juan, PR. Microbiological contamination of food stuffs 1981-2.

Consultant to Applied Scientific Computers, Caguas, PR. Computer applications to laboratories: training and software 1983-1987.

Research Associate, Wake Forest University, Winston-Salem, North Carolina, 1978-9. Courses: Seminar in Computer Applications in Biology.

Research Assistant, Wake Forest University, Winston-Salem, North Carolina, 1977.

Teaching Assistant, Wake Forest University, Winston-Salem, North Carolina, 1975-8. Courses: Aquatic Ecology, Intermediate and Introductory Biology.

Research Technician, Savannah River Ecology Laboratory, Aiken, SC, 1974-5.

### **Courses Taught**

General Microbiology, Food Microbiology, Applied Microbiology, Parasitology, Computer Applications in Science, Microbial Ecology, Advances in Immunology, Seminar in Tropical Coral Reefs, Seminar in Academia, Topics in Environmental Microbiology, Seminar in Protozoology, Biological Oceanography, General Biology, Hazardous Waste Management.

### **Reviewer**

*Legislation:* South Carolina Department of Health and Environmental Control, California State Water Resources Control Board, California Environmental Protection Agency.

*Proposals:* National Science Foundation, National Institutes for Health, US Department of Energy, National Oceanographic and Atmospheric Administration, US Department of Commerce, US Department of Interior, US Department of Agriculture, Sea Grant, North Carolina Board of Science and Technology, Water Resources Research Institute, US Environmental Protection Agency, Idaho EPSCoR, Montana EPSCoR, US Forest Service.

*Journals:* Environmental Science and Technology, Journal of Soil Contamination, Bioremediation Journal, Environmental Microbiology\*, Microbial Biotechnology\*, Applied and Environmental Microbiology\*, Microbial Ecology, Water Research, Current Microbiology, Transactions of the American Microscopical Society, Journal of Parasitology, Journal of Protozoology, Journal of the Helminthological Society of Washington, Journal of Fish Diseases, International Journal of Toxicity Assessment, BIOS, Canadian Journal of Microbiology, Transactions of the American Fisheries Society, Journal of Wildlife Diseases, American Midland Naturalist, Caribbean Journal of Science, Journal of Applied Bacteriology, Ecology, Limnology and Oceanography, Hydrobiologia, Freshwater Invertebrate Biology, Micronesia.

\* Editorial Board.

### **Community Activities**

Head Coach Pee Wee Football (AA: 13-16 years old) 1983.

Committee member, Five-year plan for the Richmond County School System, Augusta, Georgia

Head Judge for Microbiology State Science Fair 1986-7, Microbiology Judge for International Science Fair 1986, Head Judge for International Science Fair 1987, Head Judge Science Fair Aiken County Middle Schools.

Member, Board of Directors, Mayo Community Inc., Augusta, GA. 1989-1990.

Member and Chairman, Computer Committee Warren Roads Elementary School, Augusta, GA. 1991-3, 1994-5.  
 Co-Chairperson, Environment and Energy Committee, Warren Road Elementary School, Augusta, GA. 1992-3.  
 Co-President, PTA, Warren Road Elementary School, Augusta, GA. 1993-4.

### **Special Awards and Honors**

Biology Faculty of 1000 2008-  
 ASM Branch Lectureships Program 2006-2008  
 DOE BER Distinguished Scientist Award 2005  
 Wake Forest University Distinguished Biology Alumni Lecture 1999  
 United Nations Global Water Quality Task Force since 1997  
 Expert Reviewer for Swiss Environmental Biotechnology Program 11/96.  
 R&D 100 Award 1996.  
 George Westinghouse Innovation Award for 1996.  
 Federal Laboratory Consortium Award for Excellence in Technology Transfer for 1996.  
 R&D 100 Award 1995.  
**American Academy of Microbiology, Fellow. Since 1991.**  
 Central Savannah River Chapter Sigma Xi, President 1995-6.  
 Central Savannah River Chapter Sigma Xi, Vice President 1994-5.  
 DOE Biotechnology Interlaboratory Council, Councilor 1994-.  
 George Westinghouse Signature Award for excellence Corporate 1994.  
 2 George Westinghouse Signature Award for excellence Site 1994.  
 George Westinghouse Innovation Award for 1993.  
 2 George Westinghouse Signature Award for excellence Site 1993.  
 Westinghouse Savannah River Company Interim Waste Management Total Quality Award November 1990.  
 Westinghouse Savannah River Company Savannah River Technology Center Total Quality Award October 1993.  
 Savannah River Site Central Environmental Committee, Environmental Awareness Award for 1993.  
 George Westinghouse Bronze Signature Award for excellence 1990.  
 George Westinghouse Gold Signature Award for Excellence 1989.  
 Board of Visitors, Wake Forest University 1988-1992.  
 First Prize 1983 Science Writing Award Puerto Rico Institute of Culture.  
 Wake Forest Sigma Xi Research Presentation Award 1977  
 Who's Who in Medicine and Healthcare (since 1995)  
 Who's Who in American Education (since 1991)  
 American Men and Women of Science (since 1980)  
 Who's Who of Emerging Leaders in America (since 1987)  
 Who's Who in Science and Engineering (since 1991)  
 Who's Who in the Southeast (since 1979)  
 Who's Who in the World (since 1986)  
 Who's Who in the Frontiers of Science and Technology (since 1984)  
 Men of Achievement (since 1985)  
 Directory of North American Fisheries and Aquatic Scientists (since 1978)  
 San Juan Sigma Xi, Vice President 1983-1987  
 Puerto Rico Society for Microbiology, President-Elect 1984-5, President 1985-6.  
 American Society for Microbiology, Alternate Councilor Aquatic and Terrestrial Division 1986-7, Councilor 1987-9.

### **Awards and Honors of Students**

John Wear Sigma Xi grant-in-aid, 1988; Oak Ridge Associated Universities Fellowship, 1989-1993.  
 Luis Jiménez Oak Ridge Associated Universities Fellowship, 1988-1991.  
 José Marcos Soto U. S. Environmental Protection Agency internship. 1987-1988.  
 Elena J. Biamón UPR Outstanding Undergraduate Investigator in the College of Natural Sciences Award 1981.  
 Susan Joyner-Rivera NSF pre-doctoral fellowship and MARC (NIH) pre-doctoral fellowship, both beginning June 1984;  
 Peggy Wadsworth Memorial Award, Puerto Rico Natural History Society 1985.  
 Luis Báez Puerto Rico Industrial Development Bank Fellowship 1984 for graduate study at Louisiana State University,  
 Baton Rouge, La.  
 BetaBetaBeta excellent chapter award for 1984 from the National BetaBetaBeta.

**Theses Supervised** (24 completed, 16 postdoctoral fellows)**Baccalaureate** (3 completed)

Ines Muñiz. December 1987. The Survival of Enterococci in a Tropical Rain Forest Stream.

Terricita Rodríguez. September 1986. Fecal Indicators in Tropical Shellfish.

Susan Joyner. September 1982. The Bacterial Communities of Bromeliads.

**Master of Science** (17 completed)

Arleen J. López-Torres. September 1982. The Ecology of *Klebsiella pneumoniae* in Aquatic Habitats of Puerto Rico.

Carlos F. Aranda. September 1982. The Ecology of Freshwater Zooplankton in the Mameyes River, Puerto Rico.

Martha Carrillo. September 1983. Evaluation of Bifidobacteria as a Potential Indicator of Human Fecal Pollution in Tropical Freshwater Aquatic Systems.

Nerybelle Pérez Rosas. January 1984. Distribution and Survival of *Vibrio* spp. in Tropical Freshwater and Marine Environments.

Ileana López de Cardona. December 1984. Survival of Poliovirus in Tropical Waters.

Carmen Ortiz Roque. April 1986. Distribution of *Legionella* in the Waters of Puerto Rico.

Jesús Santiago Mercado. October 1986. Comparison of Four Membrane Filter Methods and the MPN Method for Detection and Enumeration of Fecal Coliform Bacteria in Tropical Waters.

Yazmín A. Rojas. February 1987. Distribution and Survival of Potentially Pathogenic Bacteria in Treated and Untreated Rum Distillery Effluents.

Jorge W. Santo Domingo. April 1987. Comparison of the In Situ Survival Rates and Cell Activity of the Indicators of Water Fecal Contamination *Streptococcus faecalis* and *Escherichia coli* in Tropical Marine Waters.

Evelyn E. Elías Montalvo. April 1987. Survival of *Yersinia enterocolitica* in Tropical Freshwater and Evaluation of a Fluorescent Antibody Method for Detection of this Bacterium in Water and Food Sources.

Susan Joyner Rivera. July 1987. Autecology of *Vibrio vulnificus* and *Vibrio parahaemolyticus* in Tropical Waters.

Norma E. CruzCruz. July 1987. In situ Survival and Plasmid Transfer Studies of *Pseudomonas aeruginosa* Strains in Tropical Fresh Waters.

Madeline Bermúdez. July 1987. Use of DNA-DNA Hybridization and Determination of the Mol % G+C for the Genetic Analysis of Environmental Isolates of *Escherichia coli* from Tropical Waters.

Abigail Negrón Alvira. July 1987. Isolation and Enumeration of *Legionella* spp. in Cooling Tower Waters in the Tropics.

José Marcos Soto Muñiz. February 1989. Evaluation of Total Coliform, Fecal Coliform, and Fecal Streptococci as Adequate Indicators in Monitoring Public Water Supply Quality in the Tropics.

Geralyne López de Victoria. February 1989. Chemotactic Behavior of Deep Subsurface Bacteria Toward Carbohydrates, Amino Acids and a Chlorinated Alkene.

Rachael O'Brien. May 1999. PCB contaminated soil chemical and biological treatment. University of California at Berkeley, Environmental Engineering.

**Doctor of Philosophy** (4 completed)

Francisco A. Fuentes. July 1987. Petroleum Biodegradation in Tropical Near-Shore Coastal Waters: Effects of Environmental Factors on Oil Degraders Growth and Metabolic Activity. UPR.

William E. Arias. December 1987. Ability of an Environmental *Escherichia coli* Isolate to Survive and Multiply in Algal Exudates of Tropical Microbial Epilithic Communities. UPR.

Luis E. Jiménez. September 1989. Molecular Analysis of Deep Terrestrial Subsurface Bacteria. UPR.

John E. Wear. December 1992. Environmental Diagnostic Analysis of Ground Water Bacteria and Their Involvement in Utilization of Aromatic Compounds. Wake Forest University.

**Post Doctoral Fellows** (14 completed, 2 in progress)

Gary A. Toranzos. 1986-1988. National Institutes of Health Grant RR-02657-01

Joel Dougherty. 1989-1992. Oak Ridge Associated Universities.

Michael Enzien. 1990-1993. Oak Ridge Associated Universities.

John E. Wear. 1993. Oak Ridge Institute for Science Education.

Robin Brigmon. 1994-1995. Oak Ridge Institute for Science Education.

Robert Gorden. 1994. Oak Ridge Institute for Science Education.

Jill D. Young. 1995-1996. Oak Ridge Institute for Science Education.  
 Joann Radway. 1996-1997. Oak Ridge Institute for Science Education.  
 Jorge Santo Domingo. 1995-1998. Oak Ridge Institute for Science Education.  
 Geryalyné López de Victoria. 1996-1998. Oak Ridge Institute for Science Education.  
 Albert Tien. 1996-1998. Oak Ridge Institute for Science Education.  
 Sadhana Chauhan. 1999-2001. University of California, Berkeley  
 Tracy Letain. 2000-2003. Natural and Accelerated Bioremediation Research Program  
 Romy Chakraborty. 2005-2008. Genomics:GTL, NASA: Astrobiology  
 Cindy H. Wu. 2007-present. Genomics:GTL, ERSP  
 Kristin DeAngelis. 2007-present. Seaborg Fellow.

#### **Grants and Contracts** (66+ funded, \$107,128K, 2 proposals pending)

##### United States Department of Energy

Contract EY-76-S-09-0900. The impact of thermal loading and other water quality parameters on the epizootiology of *Aeromonas hydrophila* infections in centrarchids. 1975-6: \$47.738K; 1976-7: \$65K; 1977-8: \$52K; 1978-9: \$52K; 1979-80: \$35K.  
 Contract EY-76-S-09-0965. *Aeromonas hydrophila* as an agent of infection in alligators. 1976-7: \$54,500; 1978: \$3,500.  
 Contract DOE HAZWRAP. Biodegradation of trichloroethylene. 1987-8: \$250K; 1988-9: \$250K; 1989-90: \$250K; 1990-91: \$250K; 1991-92: \$1,200K; 1992-93: \$500K.  
 Contract DOE OTD. Integrated demonstration of in situ remediation of trichloroethylene in soil and groundwater at SRS. 1989-90: \$750K; 1990-91: \$1,000K; 1991-92: \$2,500K; 1992-3: \$2,100K; 1993-4: \$450K  
 CRADA DOE and Bearehaven Reclamation Inc. 1994-1996: \$1,400K.  
 PAH demonstration in Poland 1995-8: \$1,200K  
 Reactor Area Bioventing Fuels 1995-7: \$227.312K  
 Aquifer Characterization 1996-7: \$361.558K  
 Biofilter Design for Styrene 1996: \$13.851K  
 DWPF LUST characterization 1996: \$49K.  
 Sanitary Landfill Bioremediation 1995-8: \$1,500K.  
 D-area Bioventing Demonstration 1996-7: \$200K.  
 Intrinsic Bioremediation 1995-7: \$500K.  
 Southern Sector Phytoremediation 1996-7: \$200K.  
 PCS Facility 1993-8: \$1,500K.  
 R basin Biopile 1996-7: \$200K.  
 Indoor Air Quality 1997: \$50K.  
 EM50 Strategic Lab Council 1998: \$50K, 1999: \$50K, 2000: \$50K, 2001: \$50K, 2002: \$50K.  
 LBNL PCB Demonstration 1998: \$15K, 1999: \$40K, 2000: \$40K.  
 LBNL Methane Biostimulation Demonstration 1998: \$15K, 1999: \$150K, 2000: \$100K.  
 ERSP (NABIR) Program Support 1998: \$50K, 1999: \$300K, 2000: \$330K, 2001: \$300K, 2002: \$300K, 2003: \$300K, 2004: \$350K, 2005: \$350K, 2006: \$500K, 2007: \$350K, 2008: \$350K.  
 NABIR Research Project Co-PI with J. Wan, T. Tokunaga, and M. Firestone. Mesoscale Biotransformation Dynamics as the Basis for Predicting Core Scale Reactive Transport of Chromium and Uranium 1999: \$260K, 2000: \$280K, 2001: \$300K, 2002: \$300K, 2003: \$300K, 2004: \$300K, 2005: \$400K, 2006: \$400K, 2007: \$400K.  
 LBNL LDRD Aerobic Landfill Bioreactor. 2000: \$140K, 2001: \$250K, 2002: \$200K.  
 NABIR Research Project Co-PI with Sue Clark, and Heino Nitsche. The role of biogeochemical dynamics in the alteration of U solid phases under oxic conditions 2001: \$300K, 2002: \$300K, 2003: \$300K.  
 SCFA Lead Lab Support 2000: \$100K, 2001: \$100K, 2002: \$156K.  
 Yucca Mountain Project. PI with B. Faybishenko. The role of microbes in hydrology of oligotrophic fractured rock environments. 2001-2: \$500K.  
 NABIR-EM Research project PI, co-PIs: J. Wan, T. Tokunaga, M. Firestone, B. Faybishenko, S. Hubbard, and P. Long. Field study of lactate injection for bioreduction of chromium at Hanford. 2002: \$75K, 2003: \$375K, 2004: \$300K, 2005: \$500K, 2006: \$500K, 2007: \$500K, 2008: \$500K.  
 Genomics:GTL Co-PI with Adam Arkin. Virtual Institute for Microbial Stress and Survival – Rapid deduction of stress response pathways in metal and radionuclide reducing bacteria (\$36.6M committed for 2002-7) 2002: \$2,500K, 2003: \$7,500K, 2004: \$8,500K, 2005: \$8,500K, 2006: \$8,500K, 2007: \$8,500K, 2008: \$8,500K  
 LBNL LDRD Real-time PCR for chlorinated-solvent degraders. Co-PI with Lisa Alvarez-Cohen. 2003: \$100K, 2004: \$85K, 2005: \$90K.

Genomics:GTL Co-PI with Mark Biggin. Protein Complex Analysis Project. (\$25M committed for 2006-2011)  
2006: \$3,500K, 2007: \$4,000K, 2008: \$4,000K

LBNL LDRD Microbial Fuel Cells. Co-PI with John Coates. 2006: \$350K, 2007: \$300K, 2008: \$100K

BER Distinguished Scientist Award (2006-2011, \$1.25M committed): 2006: \$250K, 2007: \$250K, 2008: \$250K,

2008: \$250K  
ERSP Research Project: In Situ Sequestration of <sup>90</sup>Sr and Uranium in the Vadose Zone through Microbial  
Precipitation of Phosphate Materials. Co-PI with M. Conrad, N. Spycher, P. Nico, Y. Fujita (INL). 2007: \$270K,  
2008: \$300K

Joint Bioenergy Institute (JBEI), Director of Microbial Communities. 2008: \$700K

Energy Biosciences Institute, Systems Biology Program. Co-PI with A. Arkin and Inna Dubchak. 2008: \$1,600K.

United States Department of Defense.

Strategic Environmental Research and Development Program. Methanotrophic Bioreactors for Treatment of  
Contaminated Ground Water. 1994-97: \$2,000K.

Bioremediation Education Science and Technology (BEST) PAH Bioremediation 1999: \$50K, 2000: \$1,800K.

Army Corps of Engineers. Treatability for Bioremediation of Chlorinated Solvents. 1996: \$60K.

United States Environmental Protection Agency.

Clean Beaches Program via Marin County, CA. Co-PI with G. Andersen and J. Hulls. 2008: \$200K.

National Aeronautical and Space Administration.

Astrobiology CAN-23. ITPAI (Indiana-Tennessee-Princeton Astrobiology Institute) Detection of biosustainable  
energy and nutrient cycling in the deep subsurface of Earth and Mars. 2003: \$150K, 2004: \$150K, 2005: \$200K,  
2006: \$250K, 2007: \$150K, 2008:\$60K. (Led by Indiana University)

North Carolina Board of Science and Technology

Grant 821. A study of red-sore disease and *Aeromonas hydrophila* in selected reservoirs and estuaries in North  
Carolina. 1977: \$25K.

United States Department of Interior.

Grant WRRRI project B-112-NC. A study of red-sore disease and *Aeromonas hydrophila* in selected reservoirs and  
estuaries in North Carolina. 1977-8: \$37,220; 1978-9: \$41,597.

Grant WRRRI project RUM-UPR. Effect of treated rum distillery effluents on the distribution and survival of  
potential bacterial pathogens. 1984: \$25.5K.

Grant WRRRI project RUM-UPR. A comparison of methods for the enumeration of fecal coliforms in natural waters  
of Puerto Rico. 1987: \$23K.

United States Department of Agriculture (Forest Service). Service Contract to determine indicator bacteria densities in a rain  
forest watershed. 1981: \$6.75K

National Institute of Health MBS.

Grant RR-8102. The effect of tropical water quality on pathogenic bacteria. 1981-2: \$43.343K; 1982-3: \$35.899K;  
1983-4: \$41.737K; 1984-5: \$69.016K; 1985-6: \$65.886K; 1986-7: \$42K.

Grant RR-02657-01. Thematic Grant. Parasitic Disease Research Program of Puerto Rico: Multiple Concurrent  
Infections of *Schistosoma* and bacteria. 1985-6: \$98K; 1986-7: \$90K; 1987-8: \$90K.

Minority Access to Research Careers - Honors Undergraduates. 1981-2: \$3K; 1982-3: \$3K; 1983-4: \$3K; 1984-5:  
\$3K; 1986-7: \$4K.

National Science Foundation - Resource Center for Science and Engineering.

1981-2: \$1,500; 1982-3: \$1.5K; 1983-4: \$1.5K; 1984-5: \$5K; 1985-6: \$1K; 1986-7: \$1.5K.

National Oceanographic and Atmospheric Administration (Sea Grant)

Grant NA81880-B-0031 (EN-P-45). Assessment and control of enteric virus contamination in shellfish. 1982:  
\$30K; 1983: \$16K.

Project Number R/LR-08-87-THA1. Assessment and control of pathogen contamination in mangrove oysters,  
*Crassostrea rhizophorae*. 1986: \$4K; 1987: \$42.1K.

Oficina de Coordinación de Estudios Graduados y Investigaciones, University of Puerto Rico.

The ecology of *Aeromonas hydrophila* in the Río Mameyes watershed. 1979: \$7.65K; 1980: \$5.95K; 1981:  
\$3.344K.

The ecology of fecal coliforms in the Río Mameyes watershed. 1982: \$3.5K; 1983: \$6.11K; 1984: \$4.5K; 1985:  
\$4.5K.

Protagonist. Prophet Computer Workstation, University of Puerto Rico, Río Piedras. NIH-Department of Human Resources.

1984-85: 6 months gratis use.

Contracts for technical consulting and research with Private Industry (some topics confidential)

Hyatt Hotels 1986: \$25K.

Applied Scientific Computers 1981-1987: \$30K.

La Famosa Foods 1984: \$10K.

Johnson and Johnson 1985: \$10K.  
 Radian 1997: \$30K, 1998: \$15K  
 Earthtech 1996: \$15K, 1997: \$20K, 1998: \$20K, 1999: \$20K.  
 Heritage Environmental 1999: \$10K.  
 Woodward and Clyde 1998: \$15K.  
 Priester and Associates 1996: \$40K, 1997: \$29.836K, 1998: \$20K.  
 SERA/CTC 1995: \$20K, 1996: \$30K. 1997: \$50K. 1998: \$20K.  
 STC 1996: \$20K, 1997: \$20K, 1998: \$10K.  
 American Technologies Inc. 1997: \$20K. 1998: \$15K.  
 New Tech 1994: \$40K.

### Professional Societies and Journals (10)

American Academy of Microbiology  
 American Association for the Advancement of Science  
 American Society for Microbiology  
 American Chemical Society  
 Biotechnology  
 Environmental Science and Technology  
 Microbial Ecology  
 Scientific American  
 Sigma Xi (Full member)  
 Society for Industrial Microbiology

### Patents and Invention Disclosures (5 patents issued, 9 patents filed, 13 disclosures)

**Hazen, T. C.**, B. B. Looney, S. Pfiffner, T. J. Phelps, J. Borthen, and K. Lombard. Apparatus and Method for Phosphate-Accelerated Bioremediation. U. S. Patent # 5,753,109. Issued May 19, 1998.

Kastner, J., B. B. Looney, **T. C. Hazen**, K. H. Lombard. Gas phase nutrient addition to enhance biofiltration of gaseous pollutants. SRS-96-0092. WSRC recommended filing for patent 10/3/96.

Looney, B. B., **T. C. Hazen**, S. Pfiffner, T. J. Phelps, J. Borthen, and K. Lombard. Method for Phosphate-Accelerated Bioremediation U. S. Patent #5,480,549. Issued January 2, 1996.

**Hazen, T. C.**, S. Hill, and K. Lombard. SRS sOILs Bioremediation Facility (SRS-92-0410). WSRC Patent Committee decided not to file.

**Hazen, T. C.**, and C. B. Fliermans. Bioremediation of Contaminated Groundwater (SRS-92-047). Disclosure 11/19/91. Submitted U. S. Patent Office 2/92. Allowed by US Patent Office 6/28/94, Issued 01/24/95, US Patent #5384048.

McCabe, D. and **T. C. Hazen**. LAL as a Bacteria Detector to Predict the Bacterial Fouling Capacity of Influent Water on Filters (SRS-92-040). Disclosure 11/12/91. WSRC Patent Committee decided not to file.

**Hazen, T. C.**, R. E. Long, and C. B. Fliermans. Sediment Microbial Reinoculation Chamber (SRS 90-062). Disclosure 2/7/90. WSRC Patent Committee did not recommend patent application because enforcement would be difficult 3/22/90.

**Hazen, T. C.** Chemotactic Selection of Pollutant Degrading Soil Bacteria (SRS 89-027). U.S. Patent #5324661, issue date 6/28/94.

**Hazen, T. C.**, and G. López de Victoria. Method and System for Enhancing Microbial Motility. U.S. Patent #5326703, issue date 7/05/94.

**Hazen, T. C.**, and L. Jiménez. Concentration of DNA from water using positively charged filters (S-66389). Disclosure 8/1/88. Patent applied for 6/2/89. Application abandoned by DOE 1/93.

### Bibliography (208 published, 1 in press, 9 submitted, 25 in preparation, 1842 citations, H-index=25)

Note: (*ISI Journal Impact Factor for 2007, citations as of 12/1/2008*)

1. Tang, Y. J., R. Sapro, D. C. Joyner, **T. C. Hazen**, S. Myers, D. Reichmuth, H. Blanch, and J. D. Keasling. 2009. Analysis of Metabolic Pathways and Fluxes in a Newly Discovered Thermophilic and Ethanol-Tolerant *Geobacillus* Strain. *Biotechnology and Bioengineering* 102:1377-1386. LBNL-1442E. (3.037,0)
2. **Hazen, T. C.**, R. Chakraborty, Gregory, I. R., J. P. Bowman, L. Jiménez, D. Zhang, J. M. Fleming, S. M. Pfiffner, F. J. Brockman, and G. S. Saylor. 2009. Use of gene probes to access the impact and effectiveness of aerobic in situ bioremediation of TCE and PCE. *Archives in Microbiology* 191:221-232 LBNL-47638. (1.838, 0)

3. Borglin, S. E., J. Jacobsen, D. Joyner A. Mukhopadhyay, and **T. C. Hazen**. 2009. Overcoming the anaerobic hurdle in phenotypic microarrays: Growth and visualization of *Desulfovibrio vulgaris* Hildenborough. *J. Microbiological Methods* 76:159–168. LBNL-####. (2.153, 0).
4. Tokunaga, T. K., J. Wan, Y. Kim, R. Daly, E. L. Brodie, **T. C. Hazen**, D. Herman, and M. K. Firestone. 2008. Influences of Organic Carbon Supply Rate on Uranium Bioreduction in Initially Oxidizing, Contaminated Sediment. *Environ. Sci. & Technol.* 42:8901-8907. LBNL-####. (4.363, 0)
5. Faybishenko, B., **T. C. Hazen**, P. E. Long, E. L. Brodie, M. E. Conrad, S. S. Hubbard, D. Joyner, S. Borglin, R. Chakraborty, K. H. Williams, J. E. Peterson, J. Chen, T. K. Tokunaga, J. Wan, M. Firestone, D. R. Newcomer, C. T. Resch, K. J. Cantrell, A. Willett, and S. Koenigsberg. 2008. In Situ Long-Term Bioimmobilization of Cr(VI) in Groundwater Using <sup>13</sup>C-Labeled Slow-Release Lactate. *Environ. Sci. & Technol.* 42:8478-8485. LBNL-####. (4.363, 0)
6. Wan, J., T. K. Tokunaga, Y. Kim, E. L. Brodie, R. Daly, **T. C. Hazen**, and M. K. Firestone. 2008. Effects of Organic Carbon Supply Rates on Mobility of Previously Bioreduced Uranium in a Contaminated Sediment. *Environ. Sci. & Technol.* 42:7573-7579. LBNL-619E. (4.363, 0)
7. Chivian, D., E. J. Alm, E. L. Brodie, D. E. Culley, T. Z. DeSantis, T. M. Gihring, A. Lapidus, L.-H. Lin, S. Lowry, D. P. Moser, P. Richardson, G. Southam, G. Wanger, L. M. Pratt, G. L. Andersen, **T. C. Hazen**, F. J. Brockman, A. P. Arkin, and T. C. Onstott. 2008. Environmental Genomics Reveals a Single-Species Ecosystem Deep Within Earth. *Science* 322:275-278. LBNL-1017E. (26.372, 0)
8. Hubbard, S. S., K. H. Williams, M. E. Conrad, B. Faybishenko, J. Peterson, J. Chen, P. E. Long, and **T. C. Hazen**. 2008. Geophysics for monitoring of hydrological and biogeochemical transformations associated with contaminant remediation. *Environ. Sci. & Technol.* 42:3757-3765. LBNL-145E. (4.363, 0).
9. Wu, L., X. Liu, M. W. Fields, D. K. Thompson, C. E. Bagwell, J. M. Tiedje, **T. C. Hazen**, and J. Zhou. 2008. Microarray-based whole-genome hybridization as a tool for determining soil bacteria relatedness. *The ISME Journal* 2:642-655. LBNL-1126E. (NA, 0)
10. Jacobsen, J. S., D. C. Joyner, S. E. Borglin, **T. C. Hazen**, A. P. Arkin, and E. W. Bethel. 2007. Visualization of Growth Curve Data from Phenotype Microarray Experiments. 11th International Conference on Information Visualization (IV07), Zurich, Switzerland, July 4-6, 2007. Published by the IEEE Computer Society. LBNL-63251. (NA, NA)
11. Stolyar, S., Q. He, M. P. Joachimiak, Z. He, Z. K. Yang, S. E. Borglin, D. C. Joyner, K. Huang, E. Alm, **T. C. Hazen**, J. Zhou, J. D. Wall, A. P. Arkin, and D. A. Stahl. 2007. Response of *Desulfovibrio vulgaris* to alkaline stress. *J. Bacteriol.* 189:8944-8952. LBNL-63622. (4.013, 0)
12. MacLean, L. C. W., T. J. Pray, T. C. Onstott, E. L. Brodie, **T. C. Hazen**, and G. Southam. 2007. Mineralogical, chemical and biological characterization of an anaerobic biofilm collected from a borehole in a deep gold mine in South Africa. *Geomicrobiol. J.* 24:491-504. (1.655, 0).
13. Bender, K. S., H.-C. Yen, C. L. Hemme, Z. Yang, Z. He, Q. He, J. Zhou, K. H. Huang, E. J. Alm, **T. C. Hazen**, A. P. Arkin, and J. D. Wall. 2007. Analysis of a ferric uptake regulator (Fur) mutant of *Desulfovibrio vulgaris* Hildenborough. *Appl. Environ. Microbiol.* 73:5389-5400. LBNL-56943. (4.004, 3)
14. Tang, Y. J., R. Chakraborty, H. García Martín, J. Chu, **T. C. Hazen**, and J. D. Keasling. 2007. Flux analysis of central metabolic pathways in *Geobacter metallireducens* during reduction of soluble Fe (III)-NTA. *Appl. Environ. Microbiol.* 73:3859-3864. LBNL-63533. (4.004, 2)
15. Mukhopadhyay, A., A. M. Redding, M. P. Joachimiak, A. P. Arkin, S. E. Borglin, P. S. Dehal, R. Chakraborty, J. T. Geller, **T. C. Hazen**, D. C. Joyner, V. J. J. Martin, J. D. Wall, Z. K. Yank, J. Zhou, and J. D. Keasling. 2007. Cell wide response to low oxygen exposure in *Desulfovibrio vulgaris* Hildenborough. *J. Bacteriol.* 189:5996-6010. LBNL-63534. (4.013, 3)
16. Garczarek, F., M. Dong, D. Typke, E. Witkowska, **T. C. Hazen**, E. Nogales, M. D. Biggin, and R. M. Glaeser. 2007. Octomeric pyruvate-ferredoxin oxidoreductase from *Desulfovibrio vulgaris*. *J. Struct. Biol.* 159: 9-18. LBNL-62439. (3.496, 2)
17. Tang, Y., F. Pingitore, A. Mukhopadhyay, R. Phan, **T. C. Hazen**, and J. D. Keasling. 2007. Pathway confirmation and flux analysis using <sup>13</sup>C isotopic labeling of metabolites in *Desulfovibrio vulgaris* Hildenborough via FT-ICR Mass Spectrometry. *J. Bacteriol.* 189:940-949. LBNL-61053. (4.013, 6).
18. **Hazen, T. C.**, K. Timmis, D. Stahl, E. DeLong, and M. Wagner. 2006. This issue of environmental microbiology is dedicated to the memory of David C. White. *Environmental Microbiology* 8:2059-2061. LBNL-xxxx. (4.630, 0)
19. Lin, L.-H., P.-L. Wang, D. Rumble, J. Lippmann-Pipke, B. Sherwood Lollar, E. Boice, L. Pratt, E. Brodie, **T. C. Hazen**, G. L. Andersen, T. DeSantis, D. P. Moser, D. Kershaw, and T. C. Onstott. 2006. Long term biosustainability in a high energy, low diversity crustal biotome. *Science* 314: 479-482. LBNL-60468. (26.372, 11)
20. **Hazen, T. C.**, and R. Chakraborty. 2006. Book Review: Environmental Biotechnology by Alan Scragg Oxford Press. *The Quarterly Review of Biology* 81:304. LBNL-xxxx. (5.944, 0)



42. Looney, B. B., **T. C. Hazen**, D. L. Eaton, and E. Charoglu Boemer. 2003. Technical Assistance to Kansas City Plant: Mitigation of Polychlorinated Biphenyl Discharges. DOE Office of Science and Technology. WSRC-RP-2003-00276. SRS, Aiken, SC.
43. **Hazen, T. C.**, A. J. Tien, A. Worsztynowicz, D. J. Altman, K. Ulfig, and T. Manko. 2003. Biopiles for Remediation of Petroleum-Contaminated Soils: A Polish Case Study. NATO Advanced Research Workshop Volume on The Utilization of Bioremediation to Reduce Soil Contamination: Problems and Solutions. V. Sasek, J. Glaser, and P. Bevaye. (eds). P 229-246, Kluwer Academic Publishers, Netherlands. LBNL-46445.
44. **Hazen, T. C.** 2002. Technologies to Address Leachate from the On-Site Disposal Facility at Fernald Environmental Management Project, Ohio. DOE SCFA Technical Assistance Request #143. LBNL-51387. LBNL, Berkeley, CA.
45. **Hazen, T. C.** 2002. Recommendations to Address Contaminated Soils, Concrete, and Corrective Action Management Unit/Groundwater Contamination at Ashtabula, Ohio. DOE SCFA. Technical Assistance Request #141. LBNL-51388. LBNL, Berkeley, CA.
46. **Hazen, T. C.** 2002. Evaluation of treatment and characterization alternatives of mixed waste soil and debris at Disposal Area Remedial Action (DARA) Solids Storage Facility (SSF). DOE SCFA Technical Assistance Request #136. LBNL-51389. LBNL, Berkeley, CA.
47. Looney, B. B., and **T. C. Hazen**. 2002. Technologies to Address Excavated VOC Contaminated Soil from Areas 3A/4A and Plant 6 at Fernald Environmental Management Project, Ohio. DOE SCFA Technical Assistance Request #138. Savannah River Site, Aiken, SC.
48. **Hazen, T. C.** 2002. SCFA Lead Lab Technical Assistance at Lawrence Berkeley National Laboratory: Baseline Review of Three Groundwater Plumes. DOE SCFA Technical Assistance Request #114. LBNL-47831. LBNL, Berkeley, CA.
49. Charbeneau, R., **T. C. Hazen**, and B. B. Looney. 2002. SCFA Lead Lab Independent Review of Assessment of Potential Benzene Contamination of the Ogallala Aquifer at the Pantex Plant, Texas. DOE SCFA Technical Assistance Request #81. Savannah River Site, Aiken, SC.
50. **Hazen, T. C.** 2001. SCFA Lead Lab Technical Assistance Review of SLAC Ground Water Plumes. DOE SCFA Technical Assistance Request #82. LBNL-51386. LBNL, Berkeley, CA.
51. **Hazen, T. C.** 2001. SCFA Lead Lab Technical Assistance Review of The Pit 7 Complex Source Containment. DOE SCFA Technical Assistance Request LLNL#1. LBNL-47546. LBNL, Berkeley, CA.
52. Corey, J, and **T. C. Hazen**. 2001. SCFA Technical Assistance Team to DOE Albuquerque Operation Office Sandia National Laboratory Waste Treatment And Disposal Issues with Emphasis on Managing PCBS. DOE SCFA Technical Assistance Request #2. Savannah River Site, Aiken, SC.
53. Plaza, G., K. Ulfig, and **T. C. Hazen**. 2001. Use of Molecular Techniques in Bioremediation. *Acta Microbiologica Polonica* 50:205-218. LBNL-49587 (NA, 0)
54. **Hazen, T. C.** 2001. Photograph: Heat Pollution. Pg. In: Chemistry 11 Student. McGraw Hill Ryerson Ltd.
55. **Hazen, T. C.** 2001. Photograph: Sewage treatment. Pg. In: Nine Habitats. Brown Publishing Network.
56. **Hazen, T. C.** 2001. Photograph: Poliovirus plaques. Pg. In: Microbiology. McGraw Hill Co., Inc.
57. Tokunaga, T. K., J. Wan, M. K. Firestone, **T. C. Hazen**, E. Schwartz, S. R. Sutton, and M. Newville. 2001. Chromium diffusion and reduction in soil aggregates. *Environmental Science & Technology* 35:3169-3174. LBNL-48032 (4.363, 13)
58. **Hazen, T. C.** 2000. Picture Activated Sludge. In: *The Wastewater Treatment Industry (Science in a Technical World)*. W.H Freeman.
59. Murdoch, L., J. S. Girke, J. Rossabi, J. Reed, D. Conley, J. Phelan, R. W. Falta, W. Heath, **T. C. Hazen**, R. L. Siegrist, O. R. West, M. A. Urynowicz, W. W. Slack, P. Bishop, V. Hebatpuria, L. E. Erickson, L. C. Davis, and P. A. Kulakow. 2000. Remediation of Organic Chemicals in the Vadose Zone, p. 949-1156. In B. B. Looney and R. W. Falta (ed.), *Vadose Zone Science and Technology Solutions*, vol. 2. Battelle Press, Columbus, OH.
60. Faybishenko, B., M. Bandurraga, M. Conrad, P. Cook, C. Eddy-Dilek, L. Everett, **T. C. Hazen**, S. Hubbard, A. R. Hutter, P. Jordan, C. Keller, F. J. Leij, N. Loaiciga, E. L. Majer, L. Murdoch, S. Renehan, B. Riha, J. Rossabi, Y. Rubin, A. Simmons, S. Weeks, and C. V. Williams. 2000. Vadose Zone Characterization and Monitoring: Current Technologies, p. 133-395. In B. B. Looney and R. W. Falta (ed.), *Vadose Zone Science and Technology Solutions*, vol. 1. Battelle Press, Columbus, OH. LBNL-46159.
61. **Hazen, T. C.** A. J. Tien, A. Worsztynowicz, D. J. Altman, K. Ulfig, T. Manko, and M. Kuperberg. 2000. Bioremediation of a Polish Petroleum Refinery. Final Report DOE for EM50 published by Florida State University. LBNL-46445.
62. Brigmon, R. L., D. J. Altman, M. M. Franck, **T. C. Hazen**, A. W. Bourquin, and C. B. Fliermans. 1999. Evaluation of methanotrophic bacteria during injection of gaseous nutrients for in situ trichloroethylene bioremediation in a sanitary landfill. In: *Engineered Approaches for In Situ Bioremediation of Chlorinated Solvent Contamination*. Pp. 107-112. (Leeson, A. and B. A. Alleman, Eds.) Battelle Press: Columbus, OH.
63. **Hazen, T. C.** 1999. Dinoflagellate Picture. In: *Biology: Understanding Life* by Sandra Alters. W.H Freeman.

64. Worsztynowicz, A., A. Tien, K. Ulfig, K. Zacharz, M. Adamski, D. Rzychon, **T. C. Hazen**, and D. Altman. 1999. Soil cleaning at Czechowice Refinery. M#62. Proceedings Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98). Institute for International Cooperative Environmental Research at the Florida State University. LBNL-44215.
65. Ulfig, K., G. Plaza, K. Lukasik, T. Manko, A. Worsztynowicz, A. Tien, and **T. C. Hazen**. 1999. Microbiological Changes In Petroleum-Contaminated Soil During Bioremediation at a Polish Petroleum Refinery. M#61. Proceedings Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98). Institute for International Cooperative Environmental Research at the Florida State University. LBNL-44214.
66. Tien, A. J., D. J. Altman, A. Worsztynowicz, K. Zacharz, K. Ulfig, T. Manko, **T. C. Hazen**. 1999. Bioremediation of a Process Waste Lagoon at a Southern Polish Oil Refinery - DOE's First Demonstration Project in Poland. M#9. Proceedings Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98). Institute for International Cooperative Environmental Research at the Florida State University. LBNL-44216.
67. Peters, N. E., M. Bonell, T. Hazen, S. Foster, M. Meybeck, W. Rast, G. Schneider, V. Tsirkunov, and J. Williams. 1999. Water Quality Degradation and Freshwater Availability — Need for a Global Initiative. Proceedings UNESCO colloquium, entitled "Water - A Looming Crisis" April 1998, Paris, France.
68. **Hazen, T. C.** 1999. Case Study: Full-scale in situ bioremediation demonstration (methane biostimulation) of the Savannah River Site Integrated Demonstration Project. *In: Bioremediation of Contaminated Soils* (eds) D. C. Adriano and J. M. Bollag. Monograph of the Soil Science Society of America/American Society of Agronomy. LBNL-45094. (NA, 2)
69. Tien, A. J., D. J. Altman, A. Worsztynowicz, K. Zacharz, and **T. C. Hazen**. 1999. Technology Transfer and Development for Environmental Restoration: Joint Polish-American Cooperation. 1998 Sigma Xi Forum Proceedings-International Cooperation in Science and Technology, November 12-13, 1998, Vancouver, British Columbia. p. 191-197.
70. **Hazen, T. C.** 1999. Critical Biogeochemical Parameters Used for *In Situ* Bioremediation of Solvents in Fractured Rock. P169-171. Proceedings Dynamics of Fluids in Fractured Rocks. LBNL-42718, Berkeley, CA
71. McCullough, J., **T. C. Hazen**, S. M. Benson, F. B. Metting, and A. C. Palmisano. 1999. Bioremediation of Metals and Radionuclides...What it is in how it works. 58p. LBNL-42595, Berkeley, CA.
72. Legrand, R., A. J. Morecraft, J. A. Harju, T. D. Hayes, and **T. C. Hazen**. 1998. Field Application of in situ methanotrophic treatment for TCE remediation. P. 193-198. Bioremediation and phytoremediation: chlorinated and recalcitrant compounds, ed G. B. Wickramanayake & R. E. Hinchee. Battelle Press, Columbus, OH.
73. Fuentes, F. A., J. Santo Domingo, and **T. C. Hazen**. 1998. Survival of *Candida albicans* and *Pseudomonas aeruginosa* in oil polluted tropical coastal waters. Water Research 32:2154-2170. (2.304, 1)
74. Radway, J. C., J. W. Santo Domingo, **T. C. Hazen**, and E. W. Wilde. 1998. Evaluation of biodegradation potential of foam embedded *Burkholderia cepacia* G4. Biotech. Letters 20:663-666. LBNL-44064. (0.778, 5)
75. **Hazen, T. C.** 1997. Dinoflagellate pictures. *In: Asking About Life* by A. J. Tobin. Saunders College Publishers. 962 pg.
76. Carrasco, C., H. J. Alvarez, N. Ortiz, M. Bisbal, W. Arias, and **T. C. Hazen**. 1997. Multiple antibiotic resistant *Escherichia coli* from a tropical rain forest stream. Carib. J. Sci. 33:191-197. (0.368, 0)
77. **Hazen, T. C.**, K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, J. Wear, and C.A. Eddy-Dilek. 1997. Full Scale Demonstration of *In Situ* Bioremediation of Chlorinated Solvents In the Deep Subsurface Using Gaseous Nutrient Biostimulation. Progress in Microbial Ecology p. 597-604. (NA, 3)
78. Santo Domingo, J. W., J. A. Radway, **T. C. Hazen**, and E. W. Wilde. 1997. Use of microrespirometry to determine viability of immobilized *Burkholderia cepacia* G4. Biotech Techniques 11:571-575. (0.778, 1)
79. Santo Domingo, J., C. J. Berry, and **T. C. Hazen**. 1997. Use of conventional methods and whole cell hybridization to monitor the microbial response to triethylphosphate. J. Microbiol. Meth. 29:145-151. (2.015, 2)
80. Fliermans, C. B., M. M. Franck, **T. C. Hazen**, and R. W. Gorden. 1997. Ecofunctional enzymes of microbial communities in groundwater. FEMs Microbiol. Rev. 20:379-389. (8.03, 7)
81. Ulfig, K., G. Plaza, **T. C. Hazen**, C. B. Fliermans, M. M. Franck, and K. H. Lombard. 1997. Bioremediation treatability and feasibility studies at a Polish petroleum refinery. Proceedings Warsaw96, Florida State University Press.
82. Santo Domingo, J. W., J. C. Radway, E. W. Wilde, P. Hermann, and **T. C. Hazen**. 1997. Immobilization of *Burkholderia cepacia* in polyurethane-based foams: embedding efficiency and effect on bacterial activity. J. Ind. Microbiol. & Biotech. 18:389-395. (1.195, 4)
83. **Hazen, T. C.** 1997. Controlled Phosphate-Enhanced Bioremediation Tested. EPA Tech Trends 25:3-5
84. Pfiffner, S. M., A. V. Palumbo, T. J. Phelps, and **T. C. Hazen**. 1997. Effects of nutrient dosing of subsurface methanotrophic populations and trichloroethylene degradation. J. Ind. Microbiol. Biotechnol. 18:204-212. (1.267, 16)

85. Lombard, K. H., **T. C. Hazen**, A. Worsztynowicz and B. Jagosz. 1997. Bioremediation Techniques for the Cleanup of a Petroleum Waste Lagoon. P467. In *Situ and On-Situ Bioremediation: Volume 5*.
86. **Hazen, T. C.**, A. Tien, K. H. Lombard, D. J. Altman, and A. Worsztynowicz. 1997. Czechowice Oil Refinery Bioremediation Demonstration Test Plan. WSRC-MS-97-214. Westinghouse Savannah River Company, Aiken, SC DOE - NITS.
87. Young, J. D., D. J. Altman, K. H. Lombard, A. W. Bourquin, D. C. Mosteller and **T. C. Hazen**. 1997. Sanitary Landfill Optimization test for Remediation of Chlorinated Solvents. P. 315-316. In *Situ and On-Situ Bioremediation: Volume 5*. Battelle Press.
88. Santo Domingo, J. W., B. E. Bumgarner, D. J. Altman, C. J. Berry, and **T. C. Hazen**. 1997. Physiological response of subsurface microbial communities to nutrient additions, p. 307-312. In *Situ and On-Situ Bioremediation: Volume 5*. Battelle Press.
89. Radway, J. C., J. W. Santo Domingo, C. J. Berry, E. W. Wilde, and **T. C. Hazen**. 1997. Degradation of Trichloroethylene and Benzene by Embedded *Burkholderia cepacia* G4. P 85. In *Situ and On-Situ Bioremediation: Volume 1*. Battelle Press.
90. Kastner, J. R., K. H. Lombard, J. A. Radway, J. Santo Domingo, G. L. Burbage, and **T. C. Hazen**. 1997. Characterization using laser induced fluorescence and nutrient injection via barometric pumping, p. 385-392. In *Situ and On-Situ Bioremediation: Volume 1*. Battelle Press.
91. **Hazen, T. C.** 1997. Bioremediation. In: *Microbiology of the Terrestrial Subsurface* (eds) P. Amy and D. Haldeman, p 247-266. CRC Press, Boca Raton.
92. Radway, J. C., K. H. Lombard, and **T. C. Hazen**. 1996. Final Technology Report for D-Area Oil Seepage Basin Bioventing Optimization Test, Environmental Restoration. WSRC-MS-96-0797. Westinghouse Savannah River Company, Aiken, SC DOE - NITS.
93. **Hazen, T. C.**, K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, J. Wear, and C.A. Eddy-Dilek. 1996. Innovative Site Characteristics of Microbes. Proceed. IGT Biotech Conf.
94. **Hazen, T. C.** 1996. Sanitary Landfill in situ bioremediation optimization test final report. WSRC-TR-96-0065. Westinghouse Savannah River Company, Aiken, SC DOE - NITS.
95. **Hazen, T. C.**, B. B. Looney, M. Enzien, J. M. Dougherty, J. Wear, C. B. Fliermans, and C. A. Eddy. 1996. In Situ Bioremediation Via Horizontal Wells. *Biotechnology in Industrial Waste Treatment and Bioremediation*, eds. R. F. Hickey and G. Smith, p 79-86. (NA, 1)
96. Alvarez, A. J., G. M. Yumet, C. L. Santiago, **T. C. Hazen**, R. Chaudhry, and G. A. Toranzos. 1996. In situ survival of genetically engineered microorganisms in a tropical aquatic environment. *J. Environ. Toxicol. & Water Qual.* (Environ. Toxicol.) 11:21-25. (1.373, 1)
97. **Hazen, T. C.** 1996. Photograph: Core Sediment Exam. In: *Lakes and Ponds* by Sayre, Henry Holt Publishers.
98. **Hazen, T. C.** 1995. Photograph: Poliovirus plaques. In: *Microbiology* by Prescott et al. 4th ed? Wm.C.Brown Publishers.
99. Legrand, R., R. R. Baker, T. D. Hayes, R. F. Hickey, **T. C. Hazen**, P. J. Petit. 1995. The methanotrophic fluidized bed bioreactor: from laboratory to field demonstration at the Savannah River Site. *Proceedings Air & Waste Management Association 88th mtg.* 95-RA127.02:1-13.
100. Brockman, F. J., W. Payne, D. J. Workman, A. Soong, S. Manley, and **T. C. Hazen**. 1995. Effect of gaseous nitrogen and phosphorus injection on in situ bioremediation of a trichloroethylene-contaminated site. *J. Hazardous Materials* 41:287-298. (1.433, 16)
101. **Hazen, T. C.** 1995. DOE's Savannah River Site: A Test Bed for Remediation Technologies. *Environ. Protect.* 6:12-16. (NA, 1)
102. McKay, D. J., J. S. Morse, and **T. C. Hazen**. 1994. Biodegradation of trichloroethylene by *Alcaligenes eutrophus* JMP134 in a laboratory scale bioreactor. *J. Hazardous Waste and Hazardous Materials* 11:491-499. (1.099, 2)
103. Cadotte, B., and **T. C. Hazen**. 1994. Nuclear into Environmental: The Transformation of Savannah River. *ECON Magazine* December 1994 pg 30-31.
104. **Hazen, T. C.**, J. Kramer Davis, and D. Ludowikoski. 1994. Video: In Situ Bioremediation Demonstration at SRS. 17 minutes. Westinghouse Savannah River Company, Video Services, Aiken, SC
105. **Hazen, T. C.**, K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, J. Wear, and C. A. Eddy-Dilek. 1994. Summary of In Situ Bioremediation Demonstration (Methane Biostimulation) Via Horizontal Wells at the Savannah River Site Integrated Demonstration Project. *Proceedings Thirty-Third Hanford Symposium on Health and the Environment: In-Situ Remediation: Scientific Basis for Current and Future Technologies*, p. 135-150 G. W. Gee and N. R. Wing (eds). Battelle Press, Columbus, OH. (NA, 12)
106. Lombard, K. H., and **T. C. Hazen**. 1994. A petroleum contaminated soil bioremediation facility. *Proceedings American Nuclear Society Spectrum'94*: 952-959.
107. **Hazen, T. C.**, K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, John Wear, and C. A. Eddy-Dilek. 1994. Preliminary Technology Report for In Situ Bioremediation Demonstration (Methane

- Biostimulation) of the Savannah River Site Integrated Demonstration Project. Proceedings American Nuclear Society Spectrum'94: 946-951.
108. **Hazen, T. C.** 1994. Preliminary Technology Report for In Situ Bioremediation Demonstration (Methane Biostimulation) of the Savannah River Site Integrated Demonstration Project DOE/OTD. WSRC-TR-93-670. Westinghouse Savannah River Company, Aiken, SC. (NA, 2)
  109. Lombard, K. H., and **T. C. Hazen.** 1994. Test Plan for the sOILS Facility Demonstration - Petroleum Contaminated Soil Bioremediation Facility (U). WSRC-TR-94-0179. Westinghouse Savannah River Company, Aiken, SC.
  110. Enzien, M. V., F. Picardal, **T. C. Hazen,** R. G. Arnold, and C. B. Fliermans. 1994. Reductive Dechlorination of Trichloroethylene and Tetrachloroethylene Under Aerobic Conditions in a Sediment Column. Appl. Environ. Microbiol. 60:2200-2205. (4.004, 33)
  111. Lombard, K. H., J. Borthen, and **T. C. Hazen.** 1994. Design and Configuration Management of System Control Components for in situ Methanotrophic Bioremediation of Groundwater and Sediment Contaminated with Chlorinated Hydrocarbons. April, 1993, San Diego, CA. p. 81-96. *In: Air Sparging for Site Remediation*, ed. R. E. Hinchee. Lewis Publishers, Ann Arbor, MI.
  112. Morrissey, C. M., S. E. Herbes, O. M. West, A. V. Palumbo, T. J. Phelps, and **T. C. Hazen.** 1994. Use of Laboratory Soil Columns to Optimize in situ Biotransformation of Tetrachloroethylene. P326-331. *In: Applied Biotechnology for Site Remediation.* eds. R. E. Hinchee, D. B. Anderson, F. B. Metting, and G. D. Sayles. Lewis Publishers, Ann Arbor, MI.
  113. Fliermans, C. B., J. M. Dougherty, M. M. Franck, P. C. McKinsey and **T. C. Hazen.** 1994. Immunological Techniques as Tools to Characterize the Subsurface Microbial Community at a Trichloroethylene Contaminated Site. p. 186-203. *In: Applied Biotechnology for Site Remediation.* eds. R. E. Hinchee, D. B. Anderson, F. B. Metting, and G. D. Sayles. Lewis Publishers, Ann Arbor, MI.
  114. **Hazen, T. C.,** J. M. Dougherty, M. Enzien, M. M. Franck, C. B. Fliermans, and C. A. Eddy. 1993. In Situ Bioremediation via Horizontal Wells. September, 1993, Atlanta, GA. Proceedings Emerging Technologies in Hazardous Waste Management V, The Industrial & Engineering Chemistry Division of the American Chemical Society. pg. 247-250.
  115. **Hazen, T. C.** 1994. Full-Scale Demonstration of In Situ Bioremediation of Chlorinated-Solvents at SRS. South Carolina Engineer.
  116. Fliermans, C. B., **T. C. Hazen,** and H. Bledsoe. 1993. Characterization and reclamation assessment for the Central Shops Diesel Storage Facility, Savannah River Site, Aiken, SC. (U). 135 p. WSRC-MS-93-039. Westinghouse Savannah River Company, Aiken, SC.
  117. **Hazen, T. C.** 1993. Operations Support of Phase 2 Integrated Demonstration In Situ Bioremediation Vol. 1-4. ECOVA Corp. Final Report. WSRC-TR-93-540. Westinghouse Savannah River Company, Aiken, SC.
  118. Borthen, J., F. Meyer, K. Lombard, and **T. C. Hazen.** 1993. Catalytic oxidation of trichloroethylene and perchloroethylene mixtures. Proceedings AIChE 1993 Summer National Meeting: Control and Measurement of VOC Emissions.
  119. **Hazen, T. C.,** J. M. Dougherty, M. Enzien, M. M. Franck, C. B. Fliermans, and C. A. Eddy. 1993. In Situ Bioremediation via Horizontal Wells. July, 1993, San Francisco, CA. Proceedings Hydrology Conference of the American Society of Civil Engineers, p. 862-867.
  120. **Hazen, T. C.** 1993. Guest Editorial: In-situ remediation: the hope and the hype. Centerpoint 1:15 (Publication of the USEPA Hazardous Substance Research Centers).
  121. Gorden, R. W., **T. C. Hazen,** and C. B. Fliermans. 1993. Rapid Screening for Bacteria Capable of Degrading Toxic Organic Compounds. J. Microbiol. Meth. 18:339-347. (2.015, 9)
  122. Eddy Dilek, C. A. B. B. Looney, **T. C. Hazen,** R. L. Nichols, C. B. Fliermans, W. H. Parker, J. M. Dougherty, D. S. Kaback and J. L. Simmons. 1993. Post-Test evaluation of the geology, geochemistry, microbiology, and hydrology of the In Situ Air Stripping Demonstration Site at the Savannah River Site. WSRC-TR-93-369. Westinghouse Savannah River Company, Aiken, SC.
  123. Bowman, J. P., L. Jiménez, I. Rosario, **T. C. Hazen,** and G. S. Saylor. 1993. Characterization of the methanotrophic bacterial community present in a trichloroethylene-contaminated subsurface groundwater site. Appl. Environ. Microbiol. 59:2380-2387. (4.004, 58)
  124. Looney, B. B., D. S. Kaback, **T. C. Hazen,** J. C. Corey, and D. W. Tedder. 1992. Environmental restoration using horizontal wells, A field demonstration. Proceedings of emerging technologies for hazardous waste management, American Chemical Society.
  125. Kaback, D. S., B. B. Looney, C. A. Eddy, and **T. C. Hazen.** 1992. Innovative ground water and soil remediation: in situ air stripping using horizontal wells. National Water Well Association Outdoor Action Conference.
  126. Siler, J. L., D. J. McCabe, and **T. C. Hazen.** 1991. Fouling of ceramic filters and thin-film composite reverse osmosis membranes by inorganic and bacterial constituents. Annual meeting of American Institute of Chemical Engineers.

127. McCabe, D. J., A. W. Wiggins, M. R. Poirier, and **T. C. Hazen**. 1991. Biofouling of Microfilter at the Savannah River Site F/H-Area Effluent Treatment Facility. March, 1992, Tucson, AZ. Waste Management '92.
128. **Hazen, T. C.**, L. Jiménez, G. López de Victoria, and C. B. Fliermans. 1991. Comparison of bacteria density and activity in groundwater and adjacent sediments. *Microb. Ecol.* 22:293-304. (2.558, 41)
129. **Hazen, T. C.** 1991. Test Plan for In Situ Bioremediation Demonstration of the Savannah River Integrated Demonstration Project, DOE/OTD TTP No.: SR 0566-01. WSRC-RD-91-23. 82 pp. WSRC Information Services, Aiken, SC. (NA, 11)
130. Eddy, C. A., B. B. Looney, J. M. Dougherty, **T. C. Hazen**, and D. S. Kaback. 1991. Characterization of the Geology, Geochemistry, Hydrology and Microbiology of the In-Situ Air Stripping Demonstration Site at the Savannah River Site. WSRC-RD-91-21. Westinghouse Savannah River Company, Aiken, SC.
131. Looney, B. B., **T. C. Hazen**, D. S. Kaback, and C. A. Eddy. 1991. Full Scale Field Test of the In Situ Air Stripping Process at the Savannah River Integrated Demonstration Test Site. WSRC-RD-91-22. Westinghouse Savannah River Company, Aiken, SC.
132. Fliermans, C. B., and **T. C. Hazen** (eds.). 1991. Proceedings of the First International Symposium on Microbiology of the Deep Subsurface. January 15-19, 1990. WSRC Information Services, Aiken, SC. (NA, 2)
133. Jiménez, L., G. López de Victoria, J. Wear, C. B. Fliermans and **T. C. Hazen**. 1991. Molecular analysis of deep subsurface bacteria. C. B. Fliermans and **T. C. Hazen** (eds.), Proceedings of the First International Symposium on Deep Terrestrial Subsurface Microbiology. WSRC Information Services, Aiken, SC.
134. **Hazen, T. C.**, L. Jiménez, and S. Pffifner. 1991. Isolation of microbial DNA from groundwater environments. C. B. Fliermans and **T. C. Hazen** (eds.), Proceedings of the First International Symposium on Deep Terrestrial Subsurface Microbiology. WSRC Information Services, Aiken, SC. (NA, 1)
135. **Hazen, T. C.** 1991. Deep subsurface bacterial responses to contaminants. C. B. Fliermans and **T. C. Hazen** (eds.), Proceedings of the First International Symposium on Deep Terrestrial Subsurface Microbiology. WSRC Information Services, Aiken, SC. (NA, 2)
136. **Hazen, T. C.**, and G. A. Toranzos. 1990. Microbiology of tropical source water. *In: Advances in Drinking Water Microbiology Research.* (Ed.) G. A. McFeters (ed.) Chapter 2, p. 30-51. Springer-Verlag Inc., New York. (NA, 21)
137. Dunifon, R. E. and **T. C. Hazen**. 1990. The effect of vacuum pump oil on the chemotactic behavior of soil bacteria. NTIS REPORT 9525316 20 PG.
138. Kaback, D. S., B. B. Looney, C. A. Eddy, and **T. C. Hazen**. 1990. Ground water and soil remediation: In situ air stripping using horizontal wells. DOE Report (NTIS).
139. Sharp, J. C., and **T. C. Hazen**. 1989. Biodegradation of vacuum pump oil by naturally occurring bacteria. *Georgia Journal of Science* 47:54-64. (NA, 0)
140. Muñiz, I., L. Jiménez, G. A. Toranzos, and **T. C. Hazen**. 1989. Survival and activity of *Streptococcus faecalis* in a tropical rain forest stream. *Microb. Ecol.* 18:125-134. (2.558, 3)
141. Rivera, S., T. Lugo, and **T. C. Hazen**. 1989. Autecology of *Vibrio vulnificus* and *Vibrio parahaemolyticus* in tropical waters. *Wat. Res.* 23:923-931. (2.304, 8)
142. Jiménez, L., I. Muñiz, G. A. Toranzos, and **T. C. Hazen**. 1989. The survival and activity of *Salmonella typhimurium* and *Escherichia coli* in tropical freshwater. *J. Appl. Bacteriol.* 67:61-69. (1.835, 12)
143. Santo Domingo, J. W., F. A. Fuentes, and **T. C. Hazen**. 1989. Survival and activity of *Streptococcus faecalis* and *Escherichia coli* in petroleum contaminated tropical marine waters. *Environ. Pollut.* 56:263-281. (2.205, 4)
144. Tyndall, R. L., K. Ironside, P. Metler, E. Tan, **T. C. Hazen**, and C. B. Fliermans. 1989. Effect of thermal additions on the density and distribution of thermophilic amoebae and pathogenic *Naegleria fowleri* in a newly created cooling lake. *Appl. Environ. Microbiol.* 54:722-732. (4.004, 18)
145. Pérez-Rosas, N., and **T. C. Hazen**. 1989. In situ survival of *Vibrio cholerae* and *Escherichia coli* in a tropical rain forest watershed. *Appl. Environ. Microbiol.* 55:495-499. (4.004, 15)
146. Rojas, Y., and **T. C. Hazen**. 1989. Survival of *Vibrio cholerae* in treated and untreated rum distillery effluents. *Water Res.* 23:103-113. (2.304, 3)
147. Elías-Montalvo, E. E., A. Calvo, and **T. C. Hazen**. 1989. Survival and distribution of *Yersinia enterocolitica* in tropical freshwater and food. *Curr. Microbiol.* 18:119-126. (1.075, 2)
148. López de Cardona, I., M. Bermúdez, E. Billmire and **T. C. Hazen**. 1988. Enteric Viruses in a mangrove lagoon, survival and shellfish incidence. *Carib. J. Sci.* 24:102-111. (0.368, 0)
149. Broadhead, A., L. Baéz, A. Negrón-Alvíra, **T. C. Hazen**, and J. Canoy. 1988. *Legionella* in tropical cistern waters. *Carib. J. Sci.* 24:71-73. (0.368, 0)
150. **Hazen, T. C.**, and L. Jiménez. 1988. Enumeration and identification of bacteria from environmental samples using nucleic acid probes. *Microbiol. Sci.* 5:340-343. (NA, 23)
151. **Hazen, T. C.** 1988. Fecal coliforms as indicators in tropical waters, a review. *International Journal of Toxicity Assessment* 3:461-477. (NA, 25)
152. **Hazen, T. C.** 1988. What do fecal coliforms indicate in tropical waters? DOE Report (NTIS)

153. **Hazen, T. C.** 1988. Book Review: Biotechnology and the Environment: Risk and Regulation. Ed. Teich, A. H., M. A. Levin, and J. H. Place. BIOS 57:101-102.
154. Cruz-Cruz, N. E., G. A. Toranzos, D. G. Ahearn, and **T. C. Hazen**. 1988. In situ survival of plasmid and plasmidless *Pseudomonas aeruginosa* in pristine tropical waters. Appl. Environ. Microbiol. 54:2574-2577. (3.69, 23)
155. Negrón-Alvíra, A., I. Pérez-Suarez, and **T. C. Hazen**. 1988. *Legionella* spp. in Puerto Rico cooling towers. Appl. Environ. Microbiol. 54:2331-2334. (4.004, 10)
156. **Hazen, T. C.**, F. A. Fuentes, and J. W. Santo Domingo. 1988. In situ survival and activity of pathogens and their indicators. Proc. IV ISME 406-411. (NA, 6)
157. Bermúdez, M., and **T. C. Hazen**. 1988. Phenotypic and genotypic comparison of *Escherichia coli* from pristine tropical waters. Appl. Environ. Microbiol. 54:979-983. (4.004, 18)
158. Rivera, S., **T. C. Hazen**, and G. A. Toranzos. 1988. Isolation of fecal coliforms from pristine sites in a tropical rain forest. Appl. Environ. Microbiol. 54:513-517. (4.004, 38)
159. López-Torres, A. J., L. Prieto, and **T. C. Hazen**. 1988. Comparison of the in situ survival and activity of *Klebsiella pneumoniae* and *Escherichia coli* in tropical marine environments. Microb. Ecol. 15:41-57. (2.558, 25)
160. Pérez-Rosas, N., and **T. C. Hazen**. 1988. In situ survival of *Vibrio cholerae* and *Escherichia coli* in tropical coral reefs. Appl. Environ. Microbiol. 54:1-9. (4.004, 18)
161. Santiago-Mercado, J. and **T. C. Hazen**. 1987. Comparison of four membrane filtration and MPN methods for fecal coliform enumeration in tropical waters. Appl. Environ. Microbiol. 53:2922-2928. (4.004, 33)
162. Ortiz-Roque, C., and **T. C. Hazen**. 1987. Abundance and Distribution of *Legionellaceae* in Puerto Rican Waters. Appl. Environ. Microbiol. 53:2231-2236. (4.004, 25)
163. Valdés-Collazo, L., A. J. Schultz, and **T. C. Hazen**. 1987. Survival of *Candida albicans* in tropical marine and freshwaters. Appl. Environ. Microbiol. 53:1762-1767. (4.004, 14)
164. López-Torres, A. J., **T. C. Hazen**, and G. A. Toranzos. 1987. Distribution and in situ survival and activity of *Klebsiella pneumoniae* and *Escherichia coli* in a tropical Rain Forest Watershed. Curr. Microbiol. 15:213-218. (1.075, 26)
165. **Hazen, T. C.**, J. Santiago-Mercado, G. A. Toranzos, and M. Bermúdez. 1987. What do Water Fecal Coliforms Indicate in Puerto Rico? (A Review). Bul. P. R. Med. Assoc. 79:189-193. (NA, 10)
166. Esch, G. W., **T. C. Hazen**, D. J. Marcogliese, T. M. Goater, and A. E. Crews. 1986. A long-term study of the population biology of *Crepidostomum cooperi* (Trematoda: Allocreadidae) in the burrowing mayfly, *Hexagenia limbata* (Ephemeroptera). Amer. Midl. Nat. 116: 304-314. (0.701, 11)
167. Carrillo, M., E. Estrada, and **T. C. Hazen**. 1985. Survival and enumeration of *Bifidobacterium adolescentis* and *Escherichia coli* in a tropical rain forest watershed. Appl. Environ. Microbiol. 50:468-476. (4.004, 57)
168. Fuentes, F. A., **T. C. Hazen**, A. J. López-Torres, and P. Rechani. 1985. *Klebsiella pneumoniae* in orange juice concentrate. Appl. Environ. Microbiol. 49:1527-1530. (4.004, 3)
169. **Hazen, T. C.**, R. V. Dimock, Jr., G. W. Esch, A. Mansfield, and M. L. Raker. 1984. The chemotaxis of *Aeromonas hydrophila*. Curr. Microbiol. 10:13-18. (1.075, 6)
170. Fuentes, F. A., E. J. Biamón, and **T. C. Hazen**. 1983. Bacterial chemotaxis to effluent from a rum distillery in tropical near-shore coastal waters. Appl. Environ. Microbiol. 46:1438-1441. (4.004, 7)
171. Ortiz-Roque, C., and **T. C. Hazen**. 1983. *Legionella* spp. in the waters of Puerto Rico and a short review of Legionellosis. Bul. Puerto Rico Med. Assoc. 75:403-407. (NA, 0)
172. **Hazen, T. C.** 1983. Model for *Aeromonas hydrophila* density in Albemarle Sound, NC. Microb. Ecol. 9:137-153. (2.558, 25)
173. Biamón, E. J., and **T. C. Hazen**. 1983. Survival and distribution of *Aeromonas hydrophila* in near-shore coastal waters of Puerto Rico receiving rum distillery effluent. Water Research 17:319-326. (2.304, 33)
174. **Hazen, T. C.**, and G. W. Esch. 1983. Effect of effluent from a nitrogen fertilizer factory and a pulp mill on the distribution and abundance of *Aeromonas hydrophila* in Albemarle Sound, NC. Appl. Environ. Microbiol. 45:31-42. (4.004, 32)
175. Esch, G. W., and **T. C. Hazen**. 1983. Impact of thermal loading and other water quality parameters on the epizootiology of *Aeromonas hydrophila* infections of centrarchids. Final report. DOE Report (NITS).
176. **Hazen, T. C.**, L. J. Prieto, A. J. López-Torres, and E. J. Biamón. 1982. Survival and activity of fecal coliform bacteria in near-shore coastal waters. Simposio de Recursos Naturales, Commonwealth of Puerto Rico, Department of Natural Resources. San Juan, Puerto Rico. (NA, 6)
177. **Hazen, T. C.**, G. W. Esch, R. V. Dimock, Jr., and A. Mansfield. 1982. Chemotaxis of *Aeromonas hydrophila* to the surface mucus of fish. Curr. Microbiol. 7:371-375. (1.075, 10)
178. Esch, G. W., and **T. C. Hazen**. 1982. Studies on the seasonal dynamics of *Crepidostomum cooperi* in the burrowing mayfly, *Hexagenia limbata*. Proc. Helminthol. Soc. Wash. 49:1-7. (NA, 7)

179. **Hazen, T. C.**, and C. F. Aranda. 1981. The relationship between the distribution and abundance of bacteria and water quality in the Río Mameyes watershed. pg. 87-111. Septimo Simposio de Recursos Naturales. Commonwealth of Puerto Rico, Department of Natural Resources, San Juan. (NA, 10)
180. Glassman, A. B., C. E. Bennett, and **T. C. Hazen**. 1981. Peripheral blood components in *Alligator mississippiensis*. Trans. Am. Microsc. Soc. 100:210-215. (1.071, 8)
181. Cunningham, D. S., **T. C. Hazen**, and R. E. Kuhn. 1981. Increased resistance to *Aeromonas hydrophila* in mice experimentally infected with *Trypanosoma cruzi*. J. Parasitol. 67:468-474. (1.439, 1)
182. **Hazen, T. C.**, G. W. Esch, and M. L. Raker. 1981. Agglutinating antibody to *Aeromonas hydrophila* in wild largemouth bass. Trans. Am. Fish. Soc. 110:514-518. (1.278, 8)
183. Esch, G. W., and **T. C. Hazen**. 1980. Stress and body condition in a population of largemouth bass implications for red-sore disease. Trans. Am. Fish. Soc. 109:532-536. (1.278, 20)
184. Esch, G. W., and **T. C. Hazen**. 1980. The ecology of *Aeromonas hydrophila* in Albemarle Sound, NC. Water Resources Research Institute of the University of North Carolina. Chapel Hill, NC. Report N-153 116 pg.
185. Fliermans, C. B., and **T. C. Hazen**. 1980. Serological specificity of *Aeromonas hydrophila* as measured by immunofluorescence photometric microscopy. Can. J. Microbiol. 26:161-168. (1.118, 13)
186. **Hazen, T. C.** 1979. The ecology of *Aeromonas hydrophila* in a South Carolina cooling reservoir. Microb. Ecol. 5:179-195. (2.558, 29)
187. **Hazen, T. C.**, and C. B. Fliermans. 1979. The distribution of *Aeromonas hydrophila* in natural and man-made thermal effluents. Appl. Environ. Microbiol. 38:166-168. (4.004, 30)
188. Huizinga, H., G. W. Esch, and **T. C. Hazen**. 1979. Histopathology of red-sore disease (*Aeromonas hydrophila*) in naturally and experimentally infected largemouth bass (*Micropterus salmoides*). J. Fish Dis. 2:263-277. (1.587, 29)
189. Gorden, R. W., **T. C. Hazen**, G. W. Esch, and C. B. Fliermans. 1979. Isolation of *Aeromonas hydrophila* from the American alligator, *Alligator mississippiensis*. J. Wildlife Dis. 15:239-243. (0.741, 20)
190. Esch, G. W., and **T. C. Hazen**. 1978. Impact of thermal loading and other water quality parameters on the epizootiology of red-sore disease in centrarchids. Progress Report December 1, 1977 – November 30, 1978. NITS – DOE Progress Report.
191. Esch, G. W., and **T. C. Hazen**. 1978. Thermal ecology and stress: a case history for red-sore disease in largemouth bass (*Micropterus salmoides*). p. 331-363. In: Energy and Environmental Stress in Aquatic Systems. J. H. Thorpe and J. W. Gibbons eds. DOE Symposium Series (CONF-771114). (NA, 1)
192. **Hazen, T. C.**, C. B. Fliermans, R. P. Hirsch, and G. W. Esch. 1978. The prevalence and distribution of *Aeromonas hydrophila* in the United States. Appl. Environ. Microbiol. 36:731-738. (4.004, 243)
193. **Hazen, T. C.**, J. M. Aho, G. W. Esch, T. M. Murphy, and G. Schmidt. 1978. The parasite fauna of the American alligator (*Alligator mississippiensis*) in South Carolina. J. Wildlife Dis. 14:435-439. (0.741, 12)
194. **Hazen, T. C.**, G. Smith, and R. V. Dimock, Jr. 1978. A method for fixing and staining peritrich ciliates. Microscopica Acta 81:15-16. (1.385, 0)
195. **Hazen, T. C.** 1978. Ecology of *Aeromonas hydrophila* in a South Carolina cooling reservoir. Ph. D. Thesis. Wake Forest University. Dissertation Abstract Order No: AAAD78-14969. Volume 39/03-B of Dissertation Abstracts International. Page 1112. 278 Pages. (NA, 9)
196. **Hazen, T. C.**, M. L. Raker, G. W. Esch, and C. B. Fliermans. 1978. Ultrastructure of red-sore lesions on largemouth bass (*Micropterus salmoides*): the association of the peritrich *Epistylis* sp. and the bacterium *Aeromonas hydrophila*. J. Protozool. 25:351-355. (1.403, 53)
197. Gibbons, J. W., G. W. Esch, D. H. Bennett, and **T. C. Hazen**. 1978. A long-term study of body condition of largemouth bass in a thermally altered reservoir. Nature 274:470-471. (32.182, 20)
198. **Hazen, T. C.**, G. W. Esch, A. B. Glassman, and J. W. Gibbons. 1978. Relationship of season, thermal loading and red-sore disease with various hematological parameters in *Micropterus salmoides*. J. Fish Biol. 12:491-498. (1.198, 14)
199. Quinn, T., G. W. Esch, **T. C. Hazen**, and J. W. Gibbons. 1978. Long-range movement and homing by largemouth bass (*Micropterus salmoides*) in a thermally altered reservoir. Copeia 1978:542-545. (0.748, 8)
200. **Hazen, T. C.**, and G. W. Esch. 1978. Observations on the ecology of *Clinostomum marginatum* in largemouth bass (*Micropterus salmoides*). J. Fish Biol. 12:411-420. (1.198, 6)
201. Esch, G. W., and **T. C. Hazen**. 1978. Impact of thermal loading and other water quality parameters on the epizootiology of red-sore disease in centrarchids Progress report, December 1, 1977--November 30, 1978. DOE Progress Report (NITS)
202. Fliermans, C. B., R. W. Gorden, **T. C. Hazen**, and G. W. Esch. 1977. Distribution of *Aeromonas hydrophila* in a South Carolina cooling reservoir. p. 1-30. In: Microbiology of Power Plant Thermal Effluents. DOE Symposium Series (CONF-770961-1).
203. **Hazen, T. C.**, and G. W. Esch. 1977. Studies on the population biology of two larval trematodes in the amphipod, *Hyalella azteca*. Am. Midl. Nat. 98:213-219. (0.701, 5)

204. Fliermans, C. B., R. W. Gorden, **T. C. Hazen**, and G. W. Esch. 1977. *Aeromonas* distribution and survival in a thermally altered lake. *Appl. Environ. Microbiol.* 33:114-122. (4.004, 51)
205. Esch, G. W., **T. C. Hazen**, and J. M. Aho. 1977. Parasitism and r and K selection. p. 9-62. In: *Regulation of Parasite Populations*. G. W. Esch ed. Academic Press, New York.
206. Fliermans, C. B., **T. C. Hazen**, and T. V. Crawford. 1977. Seasonal distribution of *Aeromonas hydrophila* in Par Pond. Savannah River Laboratory, Environmental Transport and Effects Research. Annual Report. DuPont, Aiken, SC.
207. Esch, G. W., **T. C. Hazen**, R. V. Dimock, Jr., and J. W. Gibbons. 1976. Thermal effluent and the epizootiology of the ciliate *Epistylis* and the bacterium *Aeromonas* in association with centrarchid fish. *Trans. Am. Microsc. Soc.* 95:687-693. (1.071, 47)
208. **Hazen, T. C.**, G. Smith, and R. V. Dimock, Jr. 1976. A method for fixing and staining peritrich ciliates. *Trans. Am. Microsc. Soc.* 95:693-695. (1.071, 1)

#### **Presentations and Media** (1080, 757 invited, 731 abstracts published)

1. Zhou\*, J., and T. C. Hazen\*. Invited co-covener. High Throughput Genomic Technologies for Complex Microbial Community Analysis. May 2009, Philadelphia, PA. Annual meeting of the American Society for Microbiology Meeting.
2. Wu\*, C. H., B. Sercu, L. C. Van De Werfhorst, T. Z. DeSantis, E. L. Brodie, **T. C. Hazen**, G. L. Andersen, and P. A. Holden. Contributed. Bacterial Biogeography of an Urban Creek Impacted with Fecal Pollution. May 2009, Philadelphia, PA. Annual meeting of the American Society for Microbiology Meeting.
3. Martinez\*, R. J., M. J. Beazley, C. H. Wu, G. L. Andersen, **T. C. Hazen**, M. Tallefert, and P. A. Sobczyk. Contributed. Microbial Phosphatase Activity Involved in Subsurface Uranium Sequestration. May 2009, Philadelphia, PA. Annual meeting of the American Society for Microbiology.
4. Chakraborty\*, R., J. Fortney, A. Zhou, M. Joachimiak, S. Borglin, A. Mukhopadhyay, Z. He, A. P. Arkin, J. Zhou, T. C. Hazen. Contributed. Investigation of salt stress responses in the metal reducing organism *Geobacter metallireducens*. May 2009, Philadelphia, PA. Annual meeting of the American Society for Microbiology.
5. Kozina\*, C. L., A. S. Pawate, D. Joyner, K. L. Sale, D. S. Reichmuth, **T. C. Hazen**, and R. Sapra. Contributed. Metabolic engineering of a novel thermophilic ethanologen *Geobacillus thermoglucosidasius* M10EXG for enhanced ethanol production. May 2009, San Francisco, CA. 31<sup>st</sup> Symposium on Biotechnology for Fuels and Chemicals, Society for Industrial Microbiology.
6. \*Knierim\*, B., L. Prak, S. Singh, D. Jorgens, M. Zemla, K. DeAngelis, A. P. Reddy, J. VanderGheynst, **T. C. Hazen**, B. M. Holmes, R. Sapra, B. A. Simmons, P. D. Adams, and M. Auer. Contributed. Electron Microscopic Imaging at JBEI. May 2009, San Francisco, CA. 31<sup>st</sup> Symposium on Biotechnology for Fuels and Chemicals, Society for Industrial Microbiology.
7. Reddy\*, A. P., M. Allgaier, P. Hugenholtz, B. A. Simmons, **T. C. Hazen**, and J. VanderGheynst. Contributed. Tracking Microbial Community Changes During Decomposition of Switchgrass. 31<sup>st</sup> Symposium on Biotechnology for Fuels and Chemicals, Society for Industrial Microbiology.
8. **Hazen, T. C.** Contributed. Systems Biology: The New Frontier for Bioenergy. May 2009, San Francisco, CA. 31<sup>st</sup> Symposium on Biotechnology for Fuels and Chemicals, Society for Industrial Microbiology.
9. Knierim\*, B., L. Prak, S. Singh, D. Jorgens, M. Zemla, K. DeAngelis, A. Reddy, J. VanderGheynst, **T. C. Hazen**, B. Holmes, R. Sapra, B. Simmons, P. Adams, and M. Auer. Invited. Electron Microscopic Imaging at JBEI. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
10. Chivian\*, D., E. J. Alm, E. L. Brodie, D. E. Culley, P. S. Dehal, T. Z. DeSantis, T. M. Gihring, A. Lapidus, L.-H. Lin, S. R. Lowry, D. P. Moser, P. Richardson, G. Southam, G. Wanger, L. M. Pratt, G. L. Andersen, **T. C. Hazen**, F. J. Brockman, A. P. Arkin, and T. C. Onstott. Invited. Environmental Genomics Reveals a Single-Species Ecosystem Deep Earth. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
11. Ramsay\*, B., C. Hwang, S. Carroll, A. Lapidus, J. C. Detter, C. Han, M. Land, L. Hauser, **T. C. Hazen**, A. Arkin, A. Belieav, R. Sanford, F. Loeffler, and M. W. Fields. Invited. Characterization of Metal-Reducing Communities and Isolates from Uranium-Contaminated Groundwater and Sediments. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
12. Brileya\*, K., C. Walker, S. Stolyar, D. A. Stahl, A. P. Arkin, **T. C. Hazen**, and M. W. Fields. Invited. Temporal and Spatial Organization within a Syntrophic Bacterial-Archaeal Biofilm. February 2009, Bethesda, MD.

- Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
13. Elias\*, D. A., Elliott C. Drury, A. M. Redding, A. Mukhopadhyay, M. Joachimiak, H.-C. B. Yen, M. W. Fields, **T. C. Hazen**, A. P. Arkin, J. D. Keasling, and J. D. Wall. Invited. Expression profiling of hypothetical genes in *Desulfovibrio vulgaris* leads to improved functional annotation. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  14. Zhou\*, A., Z. He, M. P. Joachimiak, P. S Dehal, A. P. Arkin, K. Hillesland, D. Stahl, J. Wall, **T. C. Hazen**, and J. Zhou. Invited. The molecular mechanism of adaptation to salt stress revealed by the long-term evolution of *Desulfovibrio vulgaris* Hildenborough. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  15. He\*, Q., Z. He, D. C. Joyner, M. Joachimiak, M. N. Price, Z. K. Yang, H.-C. B. Yen, C. L. Hemme, R Chakraborty, W. Chen, M. M. Fields, D. A. Stahl, J. D. Keasling, M. Keller, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Invited. Impact of Elevated Nitrate on Sulfate-Reducing Bacteria: Implications of inhibitory mechanisms in addition to osmotic stress. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  16. He, Z., A. Zhou\*, Q. He, A. Mukhopadhyay, E. Baidoo, M. Joachimiak, C. L. Hemme, P. Benke, A. M. Redding, M. M. Fields, D. A. Stahl, J. D. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Invited. *Desulfovibrio vulgaris* Hildenborough responses to salt and H<sub>2</sub>O<sub>2</sub> stresses. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  17. Van Nostrand\*, J. D., L. Wu, P. Waldron, Ye Deng, Z. He, W. Wu, S. Carroll, C. Schadt, A. Palumbo, D. Watson, C. Criddle, P. Jardine, **T. C. Hazen**, and J. Zhou. Invited. Applications of GeoChip for analysis of different microbial communities. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  18. Deutschbauer, A., J. Kuehl\*, M. Price, P. Dehal, **T. C. Hazen**, and A. P. Arkin. Invited. The development and application of an integrated functional genomics platform in *Desulfovibrio desulfuricans* G20. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  19. Dehal\*, P. S., E. J. Alm, D. Chivian, K. H. Huang, M. P. Joachimiak, K. Keller, M. N. Price, R Chakraborty, M. W. Fields, J. Zhou, D. A. Stahl, J. D. Wall, A. P. Arkin, and **T. C. Hazen**. Invited. Comparative Sequencing and Analysis of Multiple *Desulfovibrio* and Other Sulfate Reducing Species. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  20. Auer, M., M. D. Biggin, G. Butland, S. Chhabra, D. A. Elias\*, A. Fagorala, **T. C. Hazen**, D. Jorgens, D. C. Joyner, T. R. Juba, M. Perez, J. P. Remis, A. Tauscher, and J. D. Wall. Invited. Protein Complex Analysis Project (PCAP): Localization of Multi-Protein Complexes through SNAP-Tag Labeling. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  21. Chhabra, S., G. Butland\*, D. Elias, V. Fok, R. Prathapam, T. Juba, J.-M. Chandonia, E. Witkowska, M. Biggin, **T. C. Hazen**, J. D. Wall, and J. D. Keasling. Invited. A high throughput pipeline for identifying protein-protein interactions in *Desulfovibrio vulgaris* using tandem-affinity purification. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  22. Walian\*, P. J., S. Allen, L. Zeng, E. Szakal, E. Johansen, S. C. Hall, S. J. Fisher, M. E. Singer, C. Park, **T. C. Hazen**, H. E. Witkowska, M. D. Biggin, and B. K. Jap. Invited. Protein Complex Analysis Project (PCAP): Isolation and Identification of Membrane Protein Complexes from *D. vulgaris*. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  23. Dong, M., M. Daly, H. Liu, S. Allen, E. Szakal, S. C. Hall, S. J. Fisher, **T. C. Hazen**, J. T. Geller, M. E. Singer, L. L. Yang, J. Jin, H. E. Witkowska\*, and M. D. Biggin. Invited. Analysis of an Intact Dissimilatory Sulfite Reductase Protein Complex from *Desulfovibrio vulgaris* Using an Ion Mobility QTOF Analyzer. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  24. Liu\*, H., L. Yang, N. Khainovski, M. Dong, E. D. Szakal, M. Choi, S. Allen, **T. C. Hazen**, J. T. Geller, M. E. Singer, P. Walian, B. Jap, S. C. Hall, S. J. Fisher, H. E. Witkowska, J. Jin, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): Introduction of Iterative MS/MS Acquisition (IMMA) to the MALDI LC MS/MS Workflow To Enable High Throughput Protein Complex Identification using Tagless Strategy. February 2009,

- Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
25. Dong\*, M., H. Liu, L. Yang, M. Choi, E. D. Szakal, S. Allen, S. C. Hall, S. J. Fisher, G. Butland, **T. C. Hazen**, J. T. Geller, M. E. Singer, P. Walian, B. Jap, J. Jin, J.-M. Chandonia, H. E. Witkowska, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): Protein Complex Purification and Identification by "Tagless" Strategy. February 2009, Bethesda, MD. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  26. DeAngelis\*, K. M., W. L. Silver, J. Fortney, and **T. C. Hazen**. Invited. Discovery and Optimization of Lignocellulolytic Bacteria from Puerto Rican Rainforest Soils. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  27. **Hazen\***, **T. C.**, G. Anderson, S. Borglin, E. Brodie, S. van Dien, M. Fields, J. Fortney, J. Geller, E. Hendrickson, K. L. Hillesland, H.-Y. Holman, J. Leigh, T. Lie, J. Jacobsen, D. Joyner, R Chakraborty, M. Keller, A. Mukhopadhyay, C. Schadt, D. Stahl, S. Stolyar, C. Walker, J. Wall, Z. Yang, H.-C. B. Yen, G. Zane, and J. Zhou. Invited. Applied Environmental Microbiology Core Research on Stress Response Pathways in Metal-Reducers VIMSS:ESPP. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  28. **Hazen\***, **T. C.**, P. Hugenholtz, S. Singer, J. VanderGheynst, P. M. D'haeseleer, M. P. Thelen, K. DeAngelis, A. Reddy, M. Allgaier, J. Fortney, G. Andersen, T. DeSantis, E. Brodie, C. Wu, D. Goodheart, M. Firestone, W. Silver, and B. Simmons. Invited. JBEI Microbial Communities Deconstruction Research Activities. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  29. **Hazen\***, **T. C.**, H.-Y. Holman, J. Keasling, A. Mukhopadhyay, S. Chhabra, J. T. Geller, M. Singer, D. Joyner, L. Camp, T. Torok, J. Wall, D. Elias, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): High Throughput Identification and Structural Characterization of Multi-Protein Complexes During Stress Response in *Desulfovibrio vulgaris*: Microbiology Subproject. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  30. Meagher\*, R. J., M. Z. Hadi, Y. K. Light, P. Dehal, **T. C. Hazen**, A. P. Arkin, and A. K. Singh. Invited. Microfluidic tools for single-cell genomic analysis of environmental bacteria. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  31. Miller\*, L. D., A. Venkateswaran, J. Mosher, M. Drake, Z.K. Yang, M. Rodriguez, S.D. Brown, T. J. Phelps, M. Podar, A. V. Palumbo, C. W. Schadt, M. Keller, D. C. Joyner, **T. C. Hazen**, S. Stolyar, K. Hillisland, and D.A. Stahl. Invited. Development and Analysis of Multispecies Consortia to Study Microbial Community Stress and Survival. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  32. Allgaier\*, M., A. Reddy, J. VanderGheynst, A. Copeland, V. Kunin, P. D'haeseleer, K. DeAngelis, J. Fortney, D. Chivian, P. S. Dehal, B. Simmons, **T. C. Hazen**, and P. Hugenholtz. Invited. Metagenomic Characterization of Compost and Rain Forest Soil Microbial Communities. February 2009, Bethesda, MD. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  33. Mukhopadhyay\*, A., E. Luning, J. Ray, A. Deutschbauer, K. Keller, J. Robertson, G. Zane, M. Price, S. Chhabra, J. Wall, A. P. Arkin, **T. C. Hazen**, and J. Keasling. Invited. ESPP2: Study of Two component signal transduction systems in *Desulfovibrio vulgaris* Hildenborough. February 2009, Washington, DC. Genomics:GTL Contractor-Grantee Workshop VII, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2009.
  34. **Hazen, T. C.** Invited. A Systems Biology Approach to Environmental Biotechnology using Ecogenomics. January 2009, Singapore. International Society for Microbial Ecology and International Water Association Special Colloquia.
  35. **Hazen, T. C.** and G. L. Andersen. Invited. A Systems Biology Approach to Environmental Biotechnology using Ecogenomics. January 2009, Singapore. National University of Singapore.
  36. **Hazen, T. C.** Invited. Systems Biology the New Frontier for Bioenergy. January 2009, Singapore. National University of Singapore.
  37. **Hazen, T. C.** Invited. Field-Integrated Studies of Long-Term Sustainability of Chromium Bioreduction at Hanford 100H Site. December 2008, San Francisco, CA. Annual Meeting American Geophysical Union.
  38. Hu, P., R. Chakraborty, E. L. Brodie, G. L. Andersen, **T. C. Hazen**. Contributed. Reduction of Cr(VI) and survival in Cr-contaminated sites by *Caulobacter crescentus*. December 2008, San Francisco, CA. Annual Meeting American Geophysical Union.

39. Zhou, A., A. Mukhopadhyay, Z. He, C. L. Hemme, J. D. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Diverse Oxidative Stress Resistance Mechanisms in Sulfate-reducing Bacteria as Revealed by Global Analysis of the Impact of H<sub>2</sub>O<sub>2</sub> Exposure on *Desulfovibrio vulgaris* Hildenborough. December 2008, San Francisco, CA. Annual Meeting American Geophysical Union.
40. **Hazen, T. C.** Invited. Systems Biology the New Frontier for Bioenergy. November 2008, Guangzhou, China. Guangdong Institute of Microbiology, Chinese Academy of Sciences - Guangzhou.
41. **Hazen, T. C.** Invited. Life in the Slow Lane: Ecogenomics of an Extreme Environment. November 2008, Guangzhou, China. Guangdong Institute of Microbiology, Chinese Academy of Sciences - Guangzhou.
42. **Hazen, T. C.** Invited Seminar. Bioremediation: the Hope and the Hype of Environmental Cleanup. November 2008, Guangzhou, China. Guangdong Institute of Microbiology, Chinese Academy of Sciences - Guangzhou.
43. **Hazen, T. C.** Invited. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. November 2008, Guangzhou, China. Guangdong Institute of Microbiology, Chinese Academy of Sciences - Guangzhou.
44. **Hazen, T. C.** Invited. Life in the Slow Lane: Ecogenomics of an Extreme Environment. November 2008, Changsha, China. Annual Meeting of Ecological Society of China, Microbial Ecology Branch.
45. **Hazen, T. C.** Invited. Systems Biology the New Frontier for Bioenergy. November 2008, Haikou, China. Chinese Society for Microbiology and American Society for Microbiology Joint Seminar on Environmental Microbiology and Bioenergy.
46. **Hazen, T. C.** Invited. Systems Biology the New Frontier for Bioenergy. October 2008, Santa Barbara, CA. University of California at Santa Barbara, Bren School of Engineering.
47. Hazen\*, T. C., J. F. Banfield, M. Bailey, P. Hugenholtz, G. L. Andersen, and J. Zhou. Invited. Roundtable: Ecogenomics, Which Methods are Best? August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
48. Wu\*, C. H., S. R. Oman, M. E. Singer, E. L. Brodie, **T. C. Hazen**, and G. L. Andersen. Contributed. Monitoring sewage microbial community changes in ocean water with the PhyloChip. August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
49. He\*, Z., Y. Deng, J. Van Nostrand, L. Wu, C. Hemme, T. Gentry, J. Liebich, A. Arkin, T. Hazen, and J. Zhou. Contributed. Development and Application of Geochip 3.0 for Microbial Community Analysis. August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
50. Chivian\*, D., E. Alm, E. Brodie, D. Culley, P. Dehal, T. Desantis, T. Gihring, A. Lapidus, L.-H. Lin, S. Lowry, D. Moser, P. Richardson, G. Southam, G. Wanger, L. Pratt, G. Andersen, T. Hazen, F. Brockman, A. Arkin, and T. Onstott. Contributed. Environmental Genomics Reveals a Single Species Ecosystem Deep Within the Earth. August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
51. Wells\*, G., S. Kang, E. Pérez, H.-D. Park, L. Sepúlveda-Torres, B. Eggleston, E. Brodie, T. DeSantis, G. Andersen, T. Hazen, A. Massol-Deyá, J. Zhou, C. Francis, and C. Criddle. Contributed. Investigating the Core and Dispensable Microbiome in Activated Sludge with High-Density Oligonucleotide Phylogenetic and Functional Gene Microarrays. August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
52. Zhou, A., Z. He, M. Joachimiak, P. Dehal, K. Hillesland, A. Arkin, D. Stahl, J. Wall, T. Hazen, and J. Zhou\*. Contributed. The Dynamics and Genetic Adaptation to Salt Stress in Long-Term Laboratory Evolution of *Desulfovibrio vulgaris* Hildenborough. August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).
53. **Hazen, T. C.** Invited Convener. Symposium: Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology. August 2008, San Diego, CA. Society for Industrial Microbiology Annual Meeting.
54. **Hazen, T. C.** Invited. The System Biology – Integrated Omics Approach. August 2008, San Diego, CA. Society for Industrial Microbiology Annual Meeting.
55. **Hazen, T. C.** Invited. A Systems Biology Approach to Environmental Biotechnology: Holes are greater than the parts that plug them! July 2008, Oak Ridge, TN. Oak Ridge National Laboratory.
56. **Hazen, T. C.** Invited. A Systems Biology Approach to Environmental Biotechnology: Holes are greater than the parts that plug them! July 2008, Knoxville, TN. University of Tennessee.
57. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype for Environmental Cleanup. July 2008, Berkeley, CA. National Student Leadership Conference (Engineering).
58. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype for Environmental Cleanup. June 2008, Berkeley, CA. National Student Leadership Conference (Engineering).
59. Dong\*, M., M. Daly, H. Liu, S. Allen, E. Szakal, S. C. Hall, S. J. Fisher, L. L. Yang, J. Dearnley, **T. C. Hazen**, J. T. Geller, M. E. Singer, J. Jin, M. D. Biggin, B. Jap, H. E. Witkowska. Contributed. Analysis of an Intact

- Dissimilatory Sulfite Reductase Protein Complex from *Desulfovibrio vulgaris* using an Ion Mobility QTOF Analyzer. June 2008, Denver, CO. Annual Meeting ASMS Conference on Mass Spectrometry.
60. Allen\*, S., P. J. Walian, E. Szakal, H. Liu, M. Dong, E. Johansen, L. L. Yang, S. C. Hall, S. J. Fisher, **T. C. Hazen**, J. T. Geller, M. E. Singer, J. Jin, M. D. Biggin, B. Jap, H. E. Witkowska. Contributed. Toward the Development of a “Tagless” Method for the Isolation and Identification of Membrane Complexes in *Desulfovibrio vulgaris* Hildenborough. June 2008, Denver, CO. Annual Meeting ASMS Conference on Mass Spectrometry.
  61. Liu\*, H., M. Dong, L. L. Yang, S. Allen, P. J. Walian, E. Johansen, S. C. Hall, S. J. Fisher, **T. C. Hazen**, J. T. Geller, M. E. Singer, J. Jin, M. D. Biggin, B. Jap, H. E. Witkowska. Contributed. iTRAQ™ Reagent-Based “Tagless” Strategy of Identification and Purification of Soluble Protein Complexes in Bacteria: Development of High-Throughput Protocols. June 2008, Denver, CO. Annual Meeting ASMS Conference on Mass Spectrometry.
  62. **Hazen, T. C.** Invited Colloquium. Systems Biology Approaches to Metal/Radionuclide Contaminated Sites in Colloquium on Function and Activity in Microbial Consortia. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  63. He, Z. Y. Deng, J. D. Van Nostrand, L. Wu, C. L. Hemme, T. J. Gentry, J. Liebich\*, A. P. Arkin, **T. C. Hazen**, and J. Zhou. Contributed. Development of GeoChip 3.0 for Microbial Community Analysis. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  64. He, Z., E. Baidoo\*, A. Zhou, Q. He, P. Benke, R. Phan, M. Joachimiak, M. W. Fields, A. Mukhopadhyay, E. J. Alm, K. Huang, J. D. Wall, **T. C. Hazen**, J. D. Keasling, A. P. Arkin, and J. Zhou. Contributed. Global Transcriptional and Metabolite Analysis of *Desulfovibrio vulgaris* Hildenborough Response to Long-Term Exposure to elevated NaCl. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  65. Joyner\*, D. C., C. B. Walker, R. Chakraborty, J. L. Fortney, J. T. Geller, L. E. Camp, A. Zhou, Z. He, M. P. Joachimiak, S. Stolyar, J. Zhou, D. A. Stahl, A. P. Arkin, and **T. C. Hazen**. Contributed. Characterization of Stress Response in a Sulfate Reducer/Methanogen Coculture. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  66. Dong\*, M., H. Liu, **T. C. Hazen**, J. T. Geller, M. E. Singer, L. Camp, S. Allen, S. J. Fisher, S. C. Hall, E. D. Szakal, H. E. Witkowska, L. L. Yang, J. Jin, and M. D. Biggin. Contributed. Tagless Protein Complex Identification: A Novel High Throughput Strategy to Purify Protein Complexes and Identify them by Mass Spectrometry. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  67. Hemme, C., Y. Deng, T. J. Gentry\*, L. Wu, M. W. Fields, S. Green-Tringe, J. C. Detter, K. Barry, N. Kyrpides, D. Watson, P. Richardson, **T. C. Hazen**, J. Tiedje, and J. Zhou. Contributed. Comparative Metagenomics of Microbial Communities from Pristine and Contaminated Groundwater. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  68. Wu\*, L., Z. Huang, T. J. Gentry, W. Wu, Z. He, J. D. Van Nostrand, C. W. Schadt, D. Watson, P. Jardine, C. S. Criddle, J. Tiedje, **T. C. Hazen**, J. Zhou. Contributed. Microbial Community Dynamics and the Effect of Geochemistry in Uranium Bioremediation Revealed by Functional Gene Array Analysis. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  69. Schadt\*, C. W., Z. Yang, A. Venkateswaran, M. Podar, S. Brown, A. Palumbo, **T. C. Hazen**, and M. Keller. Contributed. Developing Methods for Comprehensive Transcriptome Analysis of Environmental Communities. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  70. Zhou\*, A., Z. He, A. Mukhopadhyay, C. Hemme, J. D. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Genome-Wide Transcriptomic and Proteomic Analyses of *Desulfovibrio vulgaris* Hildenborough Response to Hydrogen Peroxide. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  71. Wu, L. Y., X. Liu\*, M. W. Fields, D. K. Thompson, C. E. Bagwell, J. M. Tiedje, **T. C. Hazen**, and J. Zhou. Contributed. Microarray-Based Whole-Genome Hybridization as a Tool for Determining Prokaryotic Species Relatedness. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  72. Chakraborty, R., M. Ramos-Hernandez, E. X. Perez, Y. Katsuura, A. Massol-Deya\*, and **T. C. Hazen**. Contributed. Characterization of Novel Marine Sulfate-Reducing Bacteria Resistant to RDX and Other Explosives. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  73. Deutschbauer, A., J. Oh, M. Price, P. Dehal, D. Bruno, J. Kuehl, R. Chakraborty, **T. C. Hazen**, C. Nislow, G. Giaever, R. W. Davis, and A. P. Arkin. Contributed. Phenotypic Characterization of Microorganisms by Barcoded Transposon Mutagenesis. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  74. Waldron\*, P. J., L. Wu, J. D. Van Nostrand, D. B. Watson, Z. He, L. Y. Wu, P. M. Jardine, **T. C. Hazen**, and J. Zhou. Contributed. GeoChip Analysis of Subsurface Microbial Communities Impacted by Heavy Metal and Nitrate Contamination. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
  75. Chakraborty, R., E. L. Brodie, J. Van Nostrand, J. Zhou, and **T. C. Hazen\***. Contributed. Investigation of Cr(VI) tolerant bacteria from Cr(VI)-contaminated 100H site at Hanford, WA. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.

76. Martinez\*, R. J., M. J. Beazley, C. H. Wu, G. L. Andersen, **T. C. Hazen**, M. Taillefert, and P. A. Sobczyk. Contributed. Promoting Uranium Immobilization by the Activities of Microbial Phosphatases. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
77. Geller\*, J., S. Borglin, L. Camp, R. Chakraborty, J. Fortney, M. Singer, M. Shelby, and **T. C. Hazen**. Contributed. Diverse Applications of Extremophile Fermenters and Observations. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
78. Van Nostrand\*, J. D., W-M. Wu, L. Wu, Y. Deng, J. Carley, S. Carrol, Z. He, B. Gu, C. Criddle, P. Jardine, **T. C. Hazen**, and J. Zhou. Contributed. Microbial Functional Community Changes in a Groundwater Recirculation System during Periods of Resting, Reoxidation, and Recovery. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
79. Hadi\*, M., R. Chakraborty, Y. Light, J. L. Fortney, R. Meagher, A. P. Arkin, **T. C. Hazen**, and A. Singh. Contributed. Multigene Analysis to Elucidate Organisms Involved in Cr Bioreduction. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
80. Chakraborty\*, R., Y. J. Tang, F. Pingatore, J. D. Keasling, and **T. C. Hazen**. Contributed. Metabolic Pathways in the Pleomorphic Metal-Reducing organism *Desulfovibrio africanus* Strain PCS. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
81. Chakraborty, R., N. Ramos-Hernandez, D. C. Joyner, E. X. Perez, Y. Katsuura, A. Massol-Deya\*, and **T. C. Hazen**. Contributed. Characterization of marine sulfate-reducing bacteria resistant to RDX and other explosives. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
82. Han, B-G., D. Typke, M. Dong, **T. C. Hazen**, J. Geller, M. Singer, M. D. Biggin, and R. M. Glaeser\*. Contributed. Initial Structural Survey of Multi-Protein Complexes of *Desulfovibrio vulgaris* by Electron Microscopy. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
83. Kang\*, S., H. L. Gough, J. Van Nostrand, Z. He, L. Wu, D. A. Stahl, **T. C. Hazen**, and J. Zhou. Contributed. Microbial communities at the metal contaminated lake sediment. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
84. Wu\*, C. H., J. Chou, Y. Fujita, M. Bill, E. L. Brodie, G.L. Andersen, **T. C. Hazen**, and M. S. Conrad. Contributed. Microbial Community Stimulated by Triethyl Phosphate for Vadose Zone Sequestration of Strontium-90 and Uranium. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
85. Sercu\*, B., and C. H. Wu, L. Van De Werfhorst, E. L. Brodie, **T. C. Hazen**, G. L. Andersen, and P. A. Holden. Contributed. High Density Microarray Analysis of Water Quality in a California Coastal Creek. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
86. Elias\*, D. A., A. M. Kucken, S. D. Brown, M. M. Drake, L. A. Fagan, R. Chakraborty, C. C. Brandt, M. Podar, **T. C. Hazen**, J. D. Wall, and A. V. Palumbo. Contributed. Environmental Parameters and the Genes Involved in Mercury Methylation in the Pleomorphic *Desulfovibrio africanus*. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
87. Fortney\*, J., R. Chakraborty, M. Joachimiak, S. Borglin, A. P. Arkin, and **T. C. Hazen**. Contributed. Investigation of stress response in the metal reducing organism *Geobacter metallireducens*. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
88. Waldron, P. J., L. Wu, J. D. Van Nostrand, D. B. Watson, Z. He, C. W. Schadt, **T. C. Hazen**, P. M. Jardine\*, and J. Zhou. Contributed. Functional gene array-based analysis of microbial community structure in a gradient of nitrate and heavy metal-contaminated groundwaters. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
89. Zhou\*, A., Z. He, M. P. Joachimiak, P. S. Dehal, A. P. Arkin, K. Hillesland, D. A. Stahl, **T. C. Hazen**, and J. Zhou. Contributed. The dynamics and genetic adaptation to salt stress in experimental evolution of *Desulfovibrio vulgaris* Hildenborough. June 2008, Boston, MA. Annual Meeting American Society for Microbiology.
90. Hubbard\*, S. S., K. Williams, M. Conrad, John E. Peterson, Boris Faybishenko, Jonathan Ajo-Franklin, Terry C. Hazen, and Phil Long. Contributed. Geophysical Monitoring of Hydrological and Biogeochemical Transformations associated with Bioremediation. June 2008, Monterey, CA. Battelle International Symposium on Recalcitrant Substances.
91. **Hazen, T. C.** Invited. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. May 2008, Cincinnati, OH. EPA Biotechnology Webinar.
92. **Hazen, T. C.** Invited. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. May 2008, Berkeley, CA. University of California Berkeley, College wide BioE\* Seminar.
93. **Hazen, T. C.** Invited. Leveraged programs for site remediation. April 2008, Washington, DC. National Academy of Sciences Committee on Development and Implementation of a Cleanup Technology Roadmap for DOE's Office of Environmental Management.

94. **Hazen, T. C.** Invited Keynote. Biotechnology approaches to address issues about clean and sustainable energy production and management of waste. April 2008, Isla Verde, PR. 2nd Biotechnology Congress.
95. **Hazen, T. C.** Invited Keynote. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. April 2008, Niagara, NY. ECSC conference.
96. **Hazen, T. C.** Invited Seminar. Bioremediation: the Hope and the Hype of Environmental Cleanup. April 2008, Niagara, NY. Thomas Morton Lecture Series Niagara University.
97. Martinez\*, R. J., M. J. Beazley, C. Wu, **T. C. Hazen**, G. L. Andersen, S. M. Webb, M. Taillefert, and P. A. Sobecky. Contributed. Promoting Uranium Immobilization by the Activities of Microbial Phosphates. April 2008, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
98. Hubbard\*, S. S., J. Ajo-Franklin, H. Beller, E. Brodie, J. Chen, J. Christensen, M. Conrad, D. DePaolo, B. Faybishenko, S. Finsterle, M. Kowalsky, **T. C. Hazen**, P. Nico, S. Pride, E. Sonnenthal, N. Spycher, C. Steefel, T. Tokunaga, J. Wan, and K. Williams. Invited. Subsurface Science Scientific Focus Area at Lawrence Berkeley National Laboratory. April 2008, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
99. He\*, Z., J. Van Nostrand, Y. Deng, Y. Liang, L. Wu, P. Waldron, C. Hemme, T. Gentry, W. Wu, D. Watson, **T. C. Hazen**, C. S. Criddle, and J. Zhou. Contributed. Further Development and Applications of GeoChip for Microbial Community Analysis. April 2008, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
100. **Hazen, T. C.** Invited Keynote. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. April 2008, Manchester, CT. Connecticut Valley Branch, American Society for Microbiology
101. **Hazen, T. C.** Invited. Life in the Slow Lane: Ecogenomics of an Extreme Environment. March 2008, Walnut Creek, CA. JGI Users Meeting.
102. Hazen\*, T. C., S. E. Borglin, D. C. Joyner, and J. Jacobsen. Invited. Anaerobic Phenotypic Microarray. March 2008, Florence, Italy. Phenotypic Microarray Conference.
103. Joyner\*, D., J. Jacobsen, A. Mukhopadhyay, and **T. C. Hazen**. Contributed. Assessment of Nitrogen utilization in *Desulfovibrio vulgaris* using phenotype microarray. March 2008, Florence, Italy. Phenotypic Microarray Conference.
104. **Hazen, T. C.** Invited. Demonstration Workshop on PM visualization software and Microbesonline. March 2008, Florence, Italy. Phenotypic Microarray Conference.
105. **Hazen, T. C.** Invited. The Frontiers of Environmental Biotechnology. March 2008, San Diego, CA. AICHE Soils Conference.
106. Camp, L., S. Chhabra, D. Elias, J. T. Geller, H.-Y. Holman, D. C. Joyner, J. D. Keasling, A. Mukhopadhyay, M. Singer, T. Torok, J. D. Wall, **T. C. Hazen**, S. Allen, G. Butland, M. Choi, M. Dong, S. C. Hall, B. K. Jap, J. Jin, S. J. Fisher, H. Liu, E. Szakal, P. J. Walian, H. E. Witkowska, L. Yang, M. D. Biggin\*, P. Arbelaez, M. Auer, D. Ball, F. Garczarek, R. M. Glaeser, D. Jorgens, J. Malik, E. Nogales, H. Palsdottir, J. P. Remis, D. Typke, K. H. Downing, S. S. Andrews, A. P. Arkin, S. E. Brenner, Y. W. Huang, K. Keller, R. Santos, M. Shatsky, and J.-M. Chandonia. Invited. Protein Complex Analysis Project (PCAP): Project overview. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
107. Hazen\*, T. C., H.-Y. Holman, J. D. Keasling, A. Mukhopadhyay, S. Chhabra, J. T. Geller, M. Singer, D. C. Joyner, L. Camp, T. Torok, J. D. Wall, D. Elias, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): High Throughput Identification and Structural Characterization of Multi-Protein Complexes During Stress Response in *Desulfovibrio vulgaris*: Microbiology Subproject. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
108. Chhabra\*, S., G. Butland, D. Elias, V. Fok, B. Gold, J. Jin, A. Mukhopadhyay, R. Prathapam, W. Yang, J.-M. Chandonia, J. D. Wall, **T. C. Hazen**, and J. D. Keasling. Invited. Protein Complex Analysis Project (PCAP): High throughput strategies for tagged-strain generation in *Desulfovibrio vulgaris*. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
109. Zhou, A., Z. He, M. P. Joachimiak, P. S. Dehal, A. P. Arkin, K. Hillesland, D. Stahl, J. Wall, **T. C. Hazen**, and J. Zhou. Invited. The dynamics and genetic adaptation to salt stress in experimental evolution of *Desulfovibrio vulgaris* Hildenborough. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
110. Walker, C. B., Z. He, Z. K. Yang, J. Jacobsen, J. Joseph A. Ringbauer, Q. He, J. Zhou, G. Voordouw, J. D. Wall, A. P. Arkin, **T. C. Hazen**, S. Stoliar, and D. A. Stahl. Invited. Energy Conservation in a Biogeochemically Significant Microbial Mutualism. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
111. Van Nostrand, J. D., L. Wu, S. Kang, P. Waldron, Y. Liang, Y. Deng, Z. He, W. Wu, H. Gough, S. Carroll, C. Schadt, A. Palumbo, D. Watson, C. Criddle, P. Jardine, B. Baldwin, A. Peacock, P. Long, D. Stahl, **T. C. Hazen**, and J. Z. Zhou. Invited. Applications of GeoChip to examine functional microbial communities in metal contaminated environments. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.

112. Shutkin, A., A. P. Arkin, and **T. C. Hazen**. Invited. VIMSS:ESPP2 Scientific Research Project Management February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
113. Schadt, C., Z. Yang, A. Venkateswaran, M. Drake, S. Carroll, D. Klingeman, M. Podar, T. Phelps, S. Brown, A. Palumbo, S. Stolyar, C. Walker, D. Stahl, **T. C. Hazen**, and M. Keller. Invited. Applications of Systems Biology Approaches to Understanding Artificial Microbial Consortia and Environmental Communities in the VIMSS Applied Environmental Microbiology Core. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
114. Mukhopadhyay, A., D. Joyner, E. Luning, K. Keller, J. Robertson, G. Zane, J. Jacobsen, M. Price, S. Chhabra, **T. C. Hazen**, A. P. Arkin, J. Wall, and J. Keasling. Invited. VIMSS ESPP: Deciphering the roles of two-component systems in *Desulfovibrio vulgaris* Hildenborough. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
115. Holman, H.-Y. N., E. Wozel, Z. Lin, L. Comolli, K. H. Downing, M. Fields, and **T. C. Hazen**. Observing Polyglucose Metabolism and Transient Oxygen Stress in Obligate Anaerobes In Vivo. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
116. Hemme, C. L., Y. Deng, T. J. Gentry, L. Wu, M. W. Fields, S. Green-Tringe, C. Detter, K. Barry, N. Kyrpidis, D. Watson, P. Richardson, **T. C. Hazen**, J. Tiedje, E. Rubin, and J. Zhou. Comparative Metagenomics of Microbial Communities from Pristine and Contaminated Groundwater. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
117. He, Z., Y. Deng, J. D. V. Nostrand, L. Wu, C. Hemme, T. J. Gentry, A. P. Arkin, **T. C. Hazen**, and J. Zhou. Invited. Further development and applications of Geochip 3.0 for microbial community analysis. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
118. **Hazen, T. C.**, C. Abulencia, G. Anderson, S. Borglin, E. Brodie, S. v. Dien, M. Fields, J. Fortney, J. Geller, E. Hendrickson, H.-Y. Holman, J. Leigh, T. Lie, R. Phan, J. Jacobsen, D. Joyner, R. Chakraborty, M. Keller, A. Mukhopadhyay, C. Schadt, D. Stahl, S. Stolyar, C. Walker, J. D. Wall, E. Wozel, Z. Yang, H.-c. Yen, G. Zane, and J. Zhou. Invited. Applied Environmental Microbiology Core Research on Stress Response Pathways in Metal-Reducers VIMSS:ESPP. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
119. Elias, D. A., E. C. Drury, A. M. Redding, A. Mukhopadhyay, H.-C. B. Yen, K. H. Huang, **T. C. Hazen**, A. P. Arkin, and J. D. Wall. Invited. Expression profiling and gene association of hypothetical and conserved genes in *Desulfovibrio vulgaris* leads to functional annotation. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
120. Deutschbauer, A., J. Oh, M. Price, P. Dehal, D. Bruno, M. Henriquez, R. Chakraborty, **T. C. Hazen**, C. Nislow, G. Giaever, R. W. Davis, and A. P. Arkin. Invited. Phenotypic characterization of microorganisms by bar-coded transposon mutagenesis. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
121. Arkin, A. P., **T. C. Hazen**, C. Abulencia, E. J. Alm, G. Anderson, M. Auer, E. Baidoo, K. S. Bender, P. Benke, S. Borglin, E. Brodie, S. Brown, L. Camp, R. Chakraborty, S. Chhabra, G. Chirica, D. Chivian, M. Cipriano, P. S. Dehal, T. DeSantis, E. Drury, I. Dubchak, D. Elias, M. W. Fields, V. O. Y. Fok, J. Fortney, S. Gaucher, J. Geller, M. Hadi, Z. He, C. Hemme, K. Hillesland, H.-Y. Holman, K. H. Huang, Y. W. Huang, C. Hwang, J. Jacobsen, M. P. Joachimiak, D. Joyner, J. Keasling, K. Keller, M. Keller, Y. Light, E. Luning, R. Meagher, A. Mukhopadhyay, A. Palumbo, R. Phan, T. Phelps, F. Pingitore, M. Podar, M. N. Price, A. Redding, J. Robertson, R. Sapra, C. Schadt, M. Shirley, A. Shutkin, M. Singer, A. Singh, D. A. Stahl, S. Stolyar, A. Sundararajan, Y. Tang, J. V. Nostrand, S. Villa, C. Walker, J. D. Wall, Z. K. Yang, H.-c. Yen, G. Zane, A. Zhou, and J. Zhou. Invited. The Virtual Institute of Microbial Stress and Survival - VIMSS:ESPP Overview. February 2008, North Bethesda, MD. Genomics: GTL Awardee Workshop VI.
122. **Hazen, T. C.** Invited. JBEI and the implications for Energy Science in the US. February 2008, Berkeley, CA. University of California Guest Lecture in The Science of Climate Change Mitigation.
123. Deutschbauer, A., Y. W. Huang, K. H. Huang, E. J. Alm, D. Chivian, P. S. Dehal, M. P. Joachimiak, K. L. Keller, M. N. Price, I. Dubchak, **T. C. Hazen**, and A. P. Arkin. Invited. A systems Biological Framework for Microbial Pathway Characterization and Engineering. February 2008, Bodega Bay, CA. EBI 2008 Research Retreat.
124. **Hazen, T. C.** Invited. State-of-the-science on microbial processes affecting subsurface contamination. January 2008, Oak Ridge, TN. Webinar: Developing a Roadmap to Accelerate Deployment of Field-Scale Models to Simulate Microbially-Mediated Remediation Performance of Contaminated Sites.
125. Chakraborty\*, R., Richard Phan, Siu Pan Lam, Chin Man Leung, Eoin L. Brodie, and Terry C. Hazen. Contributed. Diverse anaerobic Cr(VI) tolerant bacteria from Cr(VI)-contaminated 100H site at Hanford. December 2007, San Francisco, CA. Annual Meeting of the American Geophysical Union.
126. Wu\*, C. H., Joyce Chou, Yoshiko Fujita, Markus Bill, Eoin L. Brodie, Gary L. Andersen, Terry C. Hazen, and Mark S. Conrad. Contributed. Microbial Populations Associated with Phosphate-Mediated Vadose Zone Sequestration of Strontium and Uranium. December 2007, San Francisco, CA. Annual Meeting of the American Geophysical Union.

127. **Hazen, T. C.** Invited Keynote. Bioremediation: The Hope and the Hype for Environmental Cleanup. November 2007, Pittsburg, PA. Allegheny Branch American Society for Microbiology.
128. **Hazen, T. C.** Invited Keynote. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. November 2007, Somerset, NJ. Theobald Smith Society, NJ Branch American Society for Microbiology.
129. **Hazen, T. C.** Invited Keynote. Bioremediation: The Hope and the Hype for Environmental Cleanup. November 2007, Auburn, AL. SE Branch American Society for Microbiology.
130. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype for Environmental Cleanup. October 2007, Mayaguez, PR. Videoconference Seminar for Department of Biology, University of Puerto Rico.
131. **Hazen, T. C.** Invited Keynote. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. October 2007, Lexington, KY. Kentucky/Tennessee Branch of the American Society for Microbiology.
132. Van Nostrand\*, J. D., Y. Deng, L. Wu, W. Wu, S. Carroll, Z. He, C. Criddle, P. Jardine, **T. C. Hazen**, and J. Z. Zhou. Contributed. Changes in Microbial Community Function During a Period of Reoxidation in a Groundwater Recirculation System. September 2007, College Park, MD. 15<sup>th</sup> Annual International Conference on Microbial Genomics.
133. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. September 2007, Niagara Falls, NY. The Second International Conference on Challenges in Site Remediation: Site Characterization & Performance Monitoring.
134. **Hazen, T. C.** Invited. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. September 2007, Niagara Falls, NY. The Second International Conference on Challenges in Site Remediation: Site Characterization & Performance Monitoring.
135. Dong, M., Haichuan Liu, Simon Allen, Steven C. Hall, Susan J. Fisher, Terry C. Hazen, Jil T. Geller, Mary E. Singer, Lee Yang, Jian Jin, Mark D. Biggin, H. Ewa Witkowska\*. Contributed. Methodological Refinements in iTRAQ™ Reagent-Based “Tagless” Strategy of Identification and Purification of Soluble Protein Complexes in Bacteria. August 2007, San Francisco, CA. 8<sup>th</sup> International Symposium on Mass spectrometry in the Health & Life Sciences: Molecular & Cellular Proteomics
136. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype for Environmental Cleanup. August 2007, Berkeley, CA. National Student Leadership Conference (Engineering).
137. **Hazen, T. C.** Invited. Systems Microbiology and Exploring Microbial Community Diversity. August 2007, Berkeley, CA. LBNL Homeland Security S&T Director Walker.
138. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype for Environmental Cleanup. July 2007, Berkeley, CA. LBNL Summer Lecture Series.
139. **Hazen, T. C.** Invited. Systems Biology in Environmental Biotechnology. June 2007, San Juan, PR. 50<sup>th</sup> Anniversary of the Puerto Rican Society of Microbiology.
140. Zhou, A., Z. He, C. Hemme, A. Mukhopadhyay, J. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Contributed. Genome-Wide Transcriptomic Analysis of *Desulfovibrio vulgaris* Hildenborough Response to Hydrogen Peroxide. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
141. Chhabra, S. R., A. Mukhopadhyay, G. Zane, C. Hemme, J. Zhou, J. Wall, **T. C. Hazen**, and J. Keasling. Contributed. Functional Characterization of the *Desulfovibrio vulgaris* Hildenborough Megaplasmid. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
142. He, Z., Y. Deng, J. D. Van Nostrand, L. Wu, C. L. Hemme, J. Liebich, T. J. Gentry, **T. C. Hazen**, A. P. Arkin, and J. Zhou. Contributed. GeoChip 3.0: Further Development and Applications of Functional Gene Arrays (FGAs) for Analysis of Microbial Communities. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
143. Hemme, C. L., Y. Deng, T. J. Gentry, L. Wu, M. W. Fields, K. Barry, D. B. Watson, N. Krypides, C. Detter, D. C. Bruce, C. W. Schadt, P. Richardson, **T. C. Hazen**, J. M. Tiedje, E. Rubin, and J. Zhou. Contributed. Comparative Metagenomics of Microbial Communities from Pristine and Contaminated Groundwater. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
144. Mohanty, S. R., E. L. Brodie, B. Kollah, **T. C. Hazen**, and E. Roden. Contributed. Comparative Analysis of Microbial Communities Associated with U(VI) Bioreduction in Ethanol-Amended Subsurface Sediment by 16S rRNA Clone Libraries and a High Density Phylogenetic DNA Microarray. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
145. Wu, L. Y., T. J. Gentry, Z. J. Huang, C. W. Schadt, W. M. Wu, D. Watson, Z. L. He, C. S. Criddle, J. M. Tiedje, **T. C. Hazen**, and J. Zhou. Contributed. Microarray-Based Analysis of Microbial Community Composition and Dynamics in Uranium Bioremediation. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.

146. Drury, E. C., A. M. Redding, A. Mukhopadhyay, K. H. Huang, **T. C. Hazen**, A. P. Arkin, J. D. Wall, D. A. Elias. Contributed. A Large Number of Hypothetical Proteins Are Differentially Expressed during Stress in *Desulfovibrio vulgaris*. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
147. He, Q., Z. He, W. Chen, Z. Yang, E. J. Alm, K. H. Huang, H-C. Yen, D. C. Joyner, M. Keller, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Contributed. Understanding the Suppression of Sulfate Reducing Bacteria by Nitrate: A Functional Genomics Approach. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
148. Hadi, M., Y. Light-Kim, J. Kaiser, P. Lane, S. P. Gaucher, G. Chirica, A. P. Arkin, **T. C. Hazen**, and A. Singh. Contributed. High-Throughput Identification of Protein Interactions in Electron-Transfer and Stress-Response Pathways in Sulfate-Reducing Bacteria *Desulfovibrio vulgaris*. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
149. Gaucher\*, S. P., G. S. Chirica, R. Sapra, A. M. Redding, A. Mukhopadhyay, G. M. Buffleben, C. Kozina, R. Phan, D. C. Joyner, J. D. Keasling, **T. C. Hazen**, A. P. Arkin, and A. K. Singh. Contributed. A Survey of Protein Post-Translational Modifications Found in the Sulfate-Reducing Bacterium *Desulfovibrio vulgaris* Hildenborough: Search for Stress Response Mediators. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62234.
150. Joyner\*, D., J. Jacobsen, A. Mukhopadhyay, and **T. C. Hazen**. Contributed. Assessment of Nitrogen utilization in *Desulfovibrio vulgaris* using phenotype microarray. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62409.
151. Daly\*, R. A., E. L. Brodie, Y. Kim, J. M. Wan, T. K. Tokunaga, G. L. Andersen, **T. C. Hazen**, and M. K. Firestone. Contributed. Influence of Electron Donor Type and Concentration on Dynamics of Bacterial Populations Associated with Uranium Reduction and Remobilization. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62410.
152. Elias\*, D. A., G. D. Butland, G. M. Zane, I. B. Hilton, **T. C. Hazen**, M. D. Biggin, and J. D. Wall. Contributed. High-throughput Identification of Multi-protein Complexes via TAP tagging in *Desulfovibrio vulgaris*. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62411.
153. Biggin\*, M. D., M. Dong, G. Butland, S. C. Hall, **T. C. Hazen**, B. K. Jap, J. Jin, S. J. Fisher, P. J. Walian, H. E. Witkowska, L. Yang, and . Contributed. High Throughput Purification and Identification of Water Soluble Multi-Protein Complex in *Desulfovibrio vulgaris*. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62421.
154. Holman\*, H.-Y. N., E. Wozel, Z. Lin, and T.C. Hazen. Contributed. Observing Molecular-Level Transient Oxygen Stress in Obligate Anaerobes In Vivo. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 2426.
155. Van Nostrand\*, J. D., Y. Liang, L. Wu, S. Carroll, Z. He, C. Criddle, **T. C. Hazen**, and J. Z. Zhou. Contributed. Changes in Microbial Community Function during a Period of Reoxidation in a Groundwater Recirculation System. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62427.
156. Brodie\*, E. L., **T. C. Hazen**, B. Faybishenko, D. Joyner, S. E. Borglin, R. Chakraborty, M. Conrad, J. Zhou, J. Van Nostrand, P. E. Long, D. R. Newcomer, and G. L. Andersen. Contributed. Phylogenetic and Functional Gene Microarray Analysis Demonstrates Direct and Indirect Mechanisms for Sustained Chromium Bioimmobilization. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62428.
157. Phan, R., R. Chakraborty, S. P. Lam, E. L. Brodie, and **T. C. Hazen**. Contributed. Isolation and Characterization of diverse anaerobic Cr(VI) tolerant bacteria from Cr(VI)-contaminated 100H site at Hanford. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62429.
158. Hazen\*, T. C., P. Dehal, A. P. Arkin, M. W. Fields, M. Keller, J. Zhou, G. L. Andersen, E. L. Brodie, D. L. Wyborski, C. B. Abulencia, C. L. Hemme, T. Gentry, D. B. Watson, and P. Richardson. Contributed. Comparison of Multiple Ecogenomics Methods for Determining Ecosystem Function in Uranium-Contaminated Environments. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62430.
159. Yang\*, Z., C. W. Schadt, **T. C. Hazen**, and M. Keller. Contributed. Towards High-Throughput and High Sensitivity Approaches for Uncovering Total Environmental Gene Expression Patterns. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62230.
160. Mukhopadhyay\*, A., A. M. Redding, A. P. Arkin, S. Borglin, P. Dehal, R. Chakraborty, J. T. Geller, B. Giles, **T. C. Hazen**, Q. He, M. Joachimiak, D. C. Joyner, J. D. Wall, Z. Yang, J. Zhou, and J. D. Keasling. Contributed. Comparison of *Desulfovibrio vulgaris* Hildenborough response to microaerobic and aerobic exposure. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62423.
161. Ramos-Hernandez\*, N., R. Chakraborty, D. C. Joyner, E. X. Perez, A. Massol-Dêya, and **T. C. Hazen**. Contributed. Chemotactic and Growth Responses to Explosives of *Desulfovibrio vulgaris* H. and Sulfate-Reducing Bacteria Isolated from Tropical Marine Sediments. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62424.

162. Perez\*, E. X., N. M. Ramos, A. A. Massol-Deyá, G. L. Andersen, Y. Piceno, E. L. Brodie, and **T. C. Hazen**. Contributed. Bacterial Diversity in Soil and Sediments from a Former Bombing Range (Vieques, PR). May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62431.
163. Wells\*, G. F., E. X. Pérez, H.-D. Park, L. C. Sepúlveda-Torres, G. L. Andersen, **T. C. Hazen**, C. A. Francis, C. S. Criddle, and A. A. Massol-Deyá. Contributed. Application of High-Density Oligonucleotide Microarrays to the Study of Crenarchaeota Community Structure and Dynamics in an Aerated Activated Sludge Wastewater Treatment Plant. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62432.
164. Waldron\*, P. J., J. D. Van Nostrand, D. B. Watson, L. Wu, Z. He, **T. C. Hazen**, and J. Zhou. Contributed. Effects of Nitrate, pH and Uranium on the Subsurface Microbial Communities Revealed by Functional Gene Arrays. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62434.
165. Chakraborty, R., Y. J. Tang, H. García-Martín, J. Chu, **T. C. Hazen**, and J. D. Keasling. Contributed. Flux analysis of central metabolic pathways in the Fe (III)-reducing organism *Geobacter metallireducens* via <sup>13</sup>C isotopic labeling. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62247.
166. Walian\*, P. J., M. Dong, S. Fisher, J. T. Geller, S. Hall, **T. C. Hazen**, D. C. Joyner, M. E. Singer, H. E. Witkowska, M. D. Biggin, B. K. Jap. Contributed. Isolation and Identification of Membrane Protein Complexes in *Desulfovibrio vulgaris* Hildenborough. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62452.
167. Chivian\*, D., E. J. Alm, E. L. Brodie, D. E. Culley, T. Gihring, A. Lapidus, L.-H. Lin, S. Lowry, D. P. Moser, P. Richardson, G. Southam, G. Wanger, L. M. Pratt, A. P. Arkin, **T. C. Hazen**, F. J. Brockman, and T. C. Onstott. Contributed. The Complete Genome of the Uncultivated Bacterium *Desulforudis audaxviator* from 2.8 km Beneath Earth's Surface. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology. LBNL 62467.
168. Singer\*, M. E., J. T. Geller, R. Chakraborty, Y. Katsuura, M. D. Biggin, and **T. C. Hazen**. Contributed. Reproducible, high quality *Desulfovibrio vulgaris* Hildenborough biomass production using anaerobic fermentors in batch and continuous flow mode. May 2007, Toronto, Canada. Annual Meeting American Society for Microbiology.
169. **Hazen, T. C.** Invited. Life in the slow lane: Deep subsurface extreme environments as analogs to Mars? May 2007, San Francisco. UCSF Annual Hamilton Symposium.
170. **Hazen, T. C.** Invited. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. May 2007, Champagne, IL. Pioneers in Genomic Biology Lecture Series, University of Illinois.
171. Conrad\*, M., **T. C. Hazen**, N. Spycher, P. Nico, E. L. Brodie, Y. Fujita, and A. Ray. Invited. In Situ Sequestration of <sup>90</sup>Sr and Uranium in the Vadose Zone through Microbial Precipitation of Phosphate Minerals. April 2007, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
172. Hazen\*, T. C., B. Faybishenko, E. Brodie, D. Joyner, S. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. Wan1, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, R. Chakraborty, P. E. Long, D. R. Newcomer, C. T. Resch, K. Cantrell, A. Willett, and S. Koenigsberg. Invited. Field-Integrated Studies of Long-Term Sustainability of Chromium Bioreduction at Hanford 100H Site. April 2007, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
173. Tokunaga\*, T. K., Y. Kim, J. Wan, R. Daly, E. L. Brodie, M. K. Firestone, and **T. C. Hazen**. Invited. Mesoscale Biotransformation of Uranium. April 2007, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
174. He\*, Z., Y. Deng, J. Van Nostrand, C. Hemme, T. Gentry, W. Wu, C. Schadt, L. Wu, B. Gu, D. Watson, **T. C. Hazen**, P. Jardine, C. S. Criddle, and J. Zhou. Invited. GeoChip: Development and Applications for Microbial Community Analysis. April 2007, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
175. Daly\*, R. A., E. L. Brodie, T. K. Tokunaga, Y. Kim, J. Wan, **T. C. Hazen**, and M. K. Firestone. Invited. Influence of Electron-Donor Form and Supply Rate on Dynamics of Bacterial Populations Associated with Uranium Reduction and Remobilization. April 2007, Lansdowne, VA. DOE Environmental Remediation Sciences Program Annual Review.
176. **Hazen, T. C.** Invited. Ecogenomics for Systems Biology Approaches to Extreme and Contaminated Environments. April 2007, Kent, OH. ASM Branch Foundation Lecture: Ohio ASM Branch.
177. **Hazen, T. C.** Invited. Systems Biology (Integration of the Omics, Bioinformatics, and Biogeochemistry): The New Frontier for Environmental Biotechnology. April 2007, Norman, OK. University of Oklahoma.
178. **Hazen, T. C.** Invited. Bioremediation of Organic Pollutants under Aerobic and Anaerobic Environmental Conditions. April 2007, Adjuntas, PR. Advances in Environmental Remediation, Instituto Comunitario de Biodiversidad y Cultura Casa Pueblo de Adjuntas, Programa de Biotecnología Industrial, Universidad de Puerto Rico – Mayaguez.

179. **Hazen, T. C.** Invited. Bioremediation of Metal Contaminated Sites. April 2007, Adjuntas, PR. Advances in Environmental Remediation, Instituto Comunitario de Biodiversidad y Cultura Casa Pueblo de Adjuntas, Programa de Biotecnología Industrial, Universidad de Puerto Rico – Mayaguez.
180. Brodie\*, E. L., and **Hazen, T. C.** Invited. Molecular Tools in Environmental Microbiology. April 2007, Adjuntas, PR. Advances in Environmental Remediation, Instituto Comunitario de Biodiversidad y Cultura Casa Pueblo de Adjuntas, Programa de Biotecnología Industrial, Universidad de Puerto Rico – Mayaguez.
181. **Hazen, T. C.** Organizer/Host. ASTAR Advanced Judicial Institute on Nanotechnology, Synthetic Biology and Environmental Biotechnology. March 2007, Berkeley, CA. ASTAR Platform B Workshop.
182. **Hazen, T. C.** Invited. Bioremediation and Environmental Biotechnology. March 2007, Berkeley, CA. ASTAR Advanced Judicial Institute on Nanotechnology, Synthetic Biology and Environmental Biotechnology Platform B Workshop.
183. **Hazen, T. C.** E. Brodie, and D. Favero. Invited. Case Study: Bioremediation (Radian Day). March 2007, Berkeley, CA. ASTAR Advanced Judicial Institute on Nanotechnology, Synthetic Biology and Environmental Biotechnology Platform B Workshop.
184. **Hazen, T. C.** Invited. Application of Proteomics to Bioremediation. March 2007, Washington, DC. DOE Workshop Identifying the Future Proteomics Needs for Biological and Environmental Research.
185. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. February 2007, Atlanta, GA. School of Biology, Georgia Institute of Technology.
186. Elias, D., S. Chhabra, J. T. Geller, H.-Y. N. Holman, D. Joyner, J. Keasling, A. Mukhopadhyay, M. Singer, T. Torok, J. Wall, **T. C. Hazen**, G. Butland, M. Dong, S. C. Hall, B. K. Jap, J. Jin, S. J. Fisher, P. J. Walian, H. E. Witkowska, L. Yang, M. D. Biggin\*, M. Auer, A. Avila-Sakar, F. Garczarek, R. M. Glaeser, J. Malik, E. Nogales, H. Palsdottir, J. P. Remis, D. Typke, K. H. Downing, S. S. Andrews, A. P. Arkin, S. E. Brenner, Y. W. Huang, J. Jacobsen, K. Keller, R. Santos, M. Shatsky, and J.-M. Chandonia. Invited. Protein Complex Analysis Project (PCAP): Project Overview. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2007. LBNL 62471.
187. Hazen\*, T. C., H.-Y. N. Holman, J. Keasling, A. Mukhopadhyay, S. Chhabra, J. T. Geller, M. Singer, D. Joyner, T. Torok, J. Wall, D. Elias, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): High Throughput Identification and Structural Characterization of Multi-Protein Complexes During Stress Response in *Desulfovibrio vulgaris*: Microbiology Subproject. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2007. LBNL 62472.
188. Abulencia, C., E. J. Alm, G. Anderson, E. Baidoo, P. Benke, S. Borglin, E. L. Brodie, R. Chakraborty, S. Chhabra, G. Chirica, D. Chivian, M. J. Cipriano, M. E. Clark, P. S. Dehal, E. C. Drury, I. Dubchak, D. A. Elias, M. W. Fields, J. Gabster, S. P. Gaucher, J. Geller, B. Giles, M. Hadi, **T. C. Hazen**, Q. He, Z. He, C. L. Hemme, E. Hendrickson, K. L. Hillesland, H.-Y. Holman, K. H. Huang, Y. W. Huang, C. Hwang, J. Jacobsen, M. P. Joachimiak, D. C. Joyner, J. D. Keasling, K. Keller, M. Keller, J. Leigh, T. Lie, A. Mukhopadhyay, R. Phan, F. Pingitore, M. Price, A. M. Redding, J. Joseph A. Ringbauer, R. Sapa, C. W. Schadt, A. Shutkin, A. K. Singh, D. A. Stahl, S. M. Stolyar, Y. Tang, J. D. Van Nostrand, C. B. Walker, J. D. Wall, E. Wozel, Z. K. Yang, H.-C. Yen, G. Zane, A. Zhou, J. Zhou, and A. P. Arkin. Invited. The Virtual Institute of Microbial Stress and Survival: An overview of the Environmental Stress Pathway Project. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop 2007. LBNL 62215.
189. Chivian, D., E. J. Alm, E. L. Brodie, D. E. Culley, T. M. Gihring, A. Lapidus, L.-H. Lin, S. Lowry, D. P. Moser, P. Richardson, G. Southam, G. Wanger, L. M. Pratt, A. P. Arkin, **T. C. Hazen**, F. J. Brockman, and T. C. Onstott. Invited. The Complete Genome of the Uncultivated Ultra-Deep Subsurface Bacterium *Desulforudis audaxviator* Obtained by Environmental Genomics. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62208.
190. Drury, E. C., A. M. Redding, A. Mukhopadhyay, K. H. Huang, **T. C. Hazen**, A. P. Arkin, J. D. Wall, and D. A. Elias. Invited. A Large Number of Hypothetical Proteins are Differentially Expressed during Stress in *Desulfovibrio vulgaris*. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62473.
191. Gaucher, S. P., A. M. Redding, G. S. Chirica, R. S. G. M. Buffleben, C. Kozina, A. Mukhopadhyay, D. C. Joyner, J. D. Keasling, **T. C. Hazen**, A. P. Arkin, D. A. Stahl, J. D. Wall, and A. K. Singh. Invited. A Survey of Protein Post-Translational Modifications Found in the Sulfate-Reducing Bacterium *Desulfovibrio vulgaris* Hildenborough. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and

- Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62475.
192. **Hazen, T. C.**, C. Abulencia, G. Anderson, S. Borglin, E. Brodie, S. v. Dien, M. Fields, J. Geller, H.-Y. Holman, R. Phan, E. Wozei, J. Jacobsen, D. Joyner, R. Chakraborty, M. Keller, A. Mukhopadhyay, D. Stahl, S. Stolyar, J. Wall, H.-C. Yen, G. Zane, J. Zhou, E. Hendrickson, T. Lie, J. Leigh, and C. Walker. Invited. VIMSS Applied Environmental Microbiology Core Research on Stress Response Pathways in Metal-Reducers. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62232.
  193. He, Q., Z. He, W. Chen, Z. Yang, E. J. Alm, K. H. Huang, H.-C. Yen, D. C. Joyner, M. Keller, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Invited. Nitrate stress response in *Desulfovibrio vulgaris* Hildenborough: Whole-Genome Transcriptomics and proteomics analyses. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62236.
  194. He, Z., J. D. Van Nostrand, L. Wu, T. J. Gentry, Y. Deng, C. W. Schadt, W. Wu, J. Liebich, S. C. Chong, B. Gu, P. Jardine, C. Criddle, D. Watson, **T. C. Hazen**, and J. Zhou. Invited. Monitoring of Microbial Reduction and Reoxidation Activities in the FRC Sites using a Comprehensive Functional Gene Array. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62231.
  195. Hemme, C. L., Y. Deng, T. Gentry, L. Wu, M. W. Fields, D. Bruce, C. Detter, K. Barry, D. Watson, P. Richardson, J. Bristow, **T. C. Hazen**, J. Tiedje, E. Rubin, A. P. Arkin, and J. Zhou. Invited. Insights into Stress Ecology and Evolution of Microbial Communities from Uranium-Contaminated Groundwater Revealed by Metagenomics Analyses. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62211.
  196. Hwang, C., W.-M. Wu, T. J. Gentry, J. Carley, S. L. Carroll, D. Watson, P. M. Jardine, J. Zhou, **T. C. Hazen**, E. L. Brodie, Y. M. Piceno, G. L. Andersen, E. X. Perez, A. Massol, C. S. Criddle, and M. W. Fields. Invited. Changes in Microbial Community Structure During Biostimulation for Uranium Reduction at Different Levels of Resolution. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62210.
  197. Klonowska, A., Z. He, Q. He, M. E. Clark, S. B. Thieman, **T. C. Hazen**, E. L. Brodie, R. Chakraborty, E. J. Alm, B. Giles, H.-Y. Holman, A. P. Arkin, J. D. Wall, J. Zhou, and M. W. Fields. Invited. *Desulfovibrio vulgaris* Responses to Hexavalent Chromium at the Community, Population, and Cellular Levels. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62214.
  198. Sapra, R., S. Gaucher, G. Chirica, C. Kozina, G. Buffleben, R. Phan, D. Joyner, **T. C. Hazen**, A. P. Arkin, and A. K. Singh. Invited. Redox Proteomics In *Desulfovibrio vulgaris* Hildenborough: Search For Proteins That Mediate Stress Response via Post-Translational Modification of the Cys Residues. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62235.
  199. Walker, C. B., D. Joyner, D. Chivian, S. S. Stolyar, K. Hillesland, J. Gabster, P. Dehal, M. Price, **T. C. Hazen**, A. P. Arkin, P. M. Richardson, D. Bruce, and D. A. Stahl. Invited. Genomic Comparisons Between a Metal-resistant Strain of *Desulfovibrio vulgaris* and the Type Strain *D. vulgaris* Hildenborough. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62207.
  200. Yang, Z., C. W. Schadt, **T. C. Hazen**, and M. Keller. Invited. Towards High-Throughput and High Sensitivity Approaches for Uncovering Total Environmental Gene Expression Patterns. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62230.
  201. Yen, H.-C., **T. C. Hazen**, Z. Yang, J. Zhou, K. H. Huang, E. J. Alm, A. P. Arkin, and J. D. Wall. Invited. Response of *Desulfovibrio vulgaris* Hildenborough to Acid pH. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62241.
  202. Zhou, A., Z. He, C. Hemme, A. Mukhopadhyay, J. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Invited. Global Gene Regulation in *Desulfovibrio vulgaris* Hildenborough. February 2007, North Bethesda, MD. Joint Genomics: GTL Awardee Workshop V and Metabolic Engineering 2007 and USDA-DOE Plant Feedstock Genomics For Bioenergy Awardee Workshop 2007. LBNL 62212.

203. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. November 2006, Chapel Hill. University of North Carolina, School of Public Health.
204. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. October 2006, Logan, UT. Utah State University.
205. Hazen\*, T. C., B. Faybishenko, E. Brodie, D. Joyner, S. Borglin, R. Chakraborty, M. Conrad, T. K. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Invited. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. October 2006, Oak Ridge, TN. DOE ERSF annual field workshop. LBNL 60236.
206. Perez\*, E. X., E. M. Rodriguez, N. Ramos, C. Shadt, J. Zhou, Y. Piceno, G. L. Andersen, E. L. Brodie, **T. C. Hazen**, and A. Massol-Dêya. Bacteria Diversity in Soil and Sediments from a former Bombing Range (Vieques, PR). September 2006, Mayaguez, Puerto Rico. 3<sup>rd</sup> Latin American and Caribbean Biotechnology Conference. LBNL 62493.
207. Ramos-Hernandez\*, N., R. Chakraborty, D. C. Joyner, E. X. Perez, A. Massol-Dêya, and **T. C. Hazen**. Contributed. Chemotactic and Growth Responses to Explosives of *Desulfovibrio vulgaris* H. and Sulfate-Reducing Bacteria Isolated from Tropical Marine Sediments. September 2006, Mayaguez, Puerto Rico. 3<sup>rd</sup> Latin American and Caribbean Biotechnology Conference. LBNL 62424.
208. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. September 2006, Mayaguez, Puerto Rico. 3<sup>rd</sup> Latin American and Caribbean Biotechnology Conference. LBNL 62496.
209. **Hazen, T. C.** Invited. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. September 2006, Mayaguez, Puerto Rico. Department of Biology, University of Puerto Rico at Mayaguez. LBNL 62496.
210. **Hazen, T. C.** Invited Keynote Speaker. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. September 2006, Humacao, Puerto Rico. 2da Actividad Regional de Biotecnologia-UPR-Humacao "Biotecnologia en al Dario vivir: mejorando nuestra calidad de vida". LBNL 62496.
211. Hazen\*, T. C., A. P. Arkin, M. W. Fields, M. Keller, J. Zhou, G. L. Andersen, E. L. Brodie, D. L. Wyborski, C. B. Abulencia, C. L. Hemme, T. Gentry, D. B. Watson, and P. Richardson. Invited. Ecogenomics for Determining Ecosystem Function in Uranium-Contaminated Environments. September 2006, San Francisco, CA. Bioremediation in Nuclear Environments, Symposium on Analytical Chemistry in Nuclear Technology, ACS fall meeting. LBNL 62497.
212. Chakraborty\*, R., D. C. Joyner, E. Wozel, H.-Y. Holman, and **T. C. Hazen**. Contributed. *Desulfovibrio* strain PCS, a metal reducing pleomorphic sulfate reducing bacterium. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62498.
213. Chakraborty\*, R., E. L. Brodie, R. Phan, Y. Piceno, G. L. Andersen, M. S. Humphrys, T. H. Hazen, P. A. Sobczyk, and **T. C. Hazen**. Contributed. Diversity of sulfate-reducing bacteria isolated from the Katrina floodwater in New Orleans. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 60258.
214. Hazen\*, T. C. and A. P. Arkin. Contributed. Integration of Omics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62499.
215. Hazen\*, T. C., A. P. Arkin, M. W. Fields, M. Keller, J. Zhou, G. L. Andersen, E. L. Brodie, D. L. Wyborski, C. B. Abulencia, C. L. Hemme, T. Gentry, D. B. Watson, and P. Richardson. Contributed. Integrated Ecogenomics for Determining Ecosystem Function in a Uranium-Contaminated Environment. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62501.
216. Brodie\*, E. L., **T. C. Hazen**, B. Faybishenko, D. Joyner, S. E. Borglin, R. Chakraborty, E. Shapland, M. Conrad, T. Tokunaga, J. Wan, S. Hubbard, K. Williams, M. Firestone, G. L. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, and S. Koenigsberg. Contributed. High Density 16S rRNA Microarray Analysis of Long-Term Chromium Bio-immobilization. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62502.
217. Chivian\*, D., E. J. Alm, F. J. Brockman, E. L. Brodie, D. E. Culley, T. Gihring, A. Lapidus, L.-H. Lin, D. P. Moser, P. Richardson, A. P. Arkin, **T. C. Hazen**, and T. C. Onstott. Invited. Environmental Genomic Characterization of a Deep Subsurface Microorganism. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62503.
218. Hazen\*, T. C., T. C. Onstott, E. J. Alm, A. P. Arkin, F. J. Brockman, E. L. Brodie, D. Chivan, D. E. Culley, T. Ghring, A. Lapidus, L.-H. Lin, D. P. Moser, and P. Richardson. Contributed. Metagenomic characterization of a deep

- subsurface microorganism. August 2006, Vienna, Austria. 11<sup>th</sup> International Symposium on Microbial Ecology. LBNL 62504.
219. Perez, E. X., E. M. Rodriguez, N. Ramos, C. Shadt, J. Zhou, Y. Piceno, G. L. Andersen, E. L. Brodie, **T. C. Hazen**, and A. Massol-Dêya. Bacteria Diversity in Soil and Sediments from a former Bombing Range (Vieques, PR). August 2006, Berkeley, CA. LBNL Summer Student Presentations.
  220. Ramos-Hernandez, N., R. Chakraborty, D. C. Joyner, E. X. Perez, A. Massol-Dêya, and **T. C. Hazen**. Contributed. Chemotactic and Growth Responses to Explosives of *Desulfovibrio vulgaris* H. and Sulfate-Reducing Bacteria Isolated from Tropical Marine Sediments. August 2006, Berkeley, CA. LBNL Summer Student Presentations **Hazen, T. C.** Invited. Bioremediation technologies for petroleum. August 2006, Beijing, China. Department of Environmental Science & Engineering, Tsinghua University.
  221. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. August 2006, Beijing, China. Institute of Microbiology, Chinese Academy of Sciences.
  222. **Hazen, T. C.** Invited. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. August 2006, Beijing, China. Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences.
  223. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. August 2006, Changsha, China. Central South University
  224. **Hazen, T. C.** Invited. Advances in Field Research on Bioremediation of Metals and Radionuclides. August 2006, Changsha, China. Central South University.
  225. **Hazen, T. C.** Invited. Stress Response Pathways and Biofilms. June 2006, Bozeman, MT. Inland Northwest Research Alliance meeting on Bioremediation. Center for Biofilm Engineering Montana State University.
  226. Long\*, P. E., D. R. Newcomer, C. T. Resch, K. Cantrell, B. Faybishenko, **T. C. Hazen**, E. Brodie, D. Joyner, S. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, A. Willett, and S. Koenigsberg. Contributed. Evaluation of the Effectiveness of Cr(VI) Biostimulation in Groundwater at Hanford 100H Site. May 2006, Baltimore, MD. Spring meeting of American Geophysical Union.
  227. Faybishenko\*, B., **T. C. Hazen**, E. Brodie, D. Joyner, S. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, C. T. Resch, A. Willett, and S. Koenigsberg. Contributed. Tracer Tests and Field Monitoring of In situ Cr(VI) Bioreduction at the Hanford 100H Site. May 2006, Baltimore, MD. Spring meeting of American Geophysical Union.
  228. Brodie\*, E., and **T. C. Hazen**. Contributed. Integration of the Omics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. May 2006, Monterey, CA. The Fifth International Conference on Remediation of Chlorinated and Recalcitrant Compounds.
  229. Tabak, H. H., and **T. C. Hazen**\*. Contributed. Advances in Bioremediation of Soils and Sediments Polluted with Metals and Radionuclides: 2. Field Research on Bioremediation of Metals and Radionuclides. May 2006, Monterey, CA. The Fifth International Conference on Remediation of Chlorinated and Recalcitrant Compounds.
  230. Mukhopadhyay\*, A., Z. He, E. Alm, A. Arkin, E. Baidoo, S. Borglin, W. Chen, **T. C. Hazen**, Q. He, H-Y. Holman, K. Huang, D. Joyner, M. Keller, P. Oeller, A. Redding, J. Sun, J. Wall, J. Wei, H-C. Yen, J. Zhou, and J. Keasling. Contributed. Salt Stress in *Desulfovibrio vulgaris* Hildenborough: An Integrated Genomics Approach. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
  231. Hadi\*, M. Z., J. Crawford-Dibble, P. Lane, S. Gaucher, T. Hazen, A. Arkin, and A. Singh. Contributed. High Throughput Methods for Protein Complex Isolation and Identification. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
  232. Redding\*, A., A. Mukhopadhyay, D. Joyner, **T. C. Hazen**, and J. Keasling. Contributed. Quantitative Proteomic Analysis of Nitrate Stress in *Desulfovibrio vulgaris*. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
  233. Tang, Y. J., A. Mukhopadhyay, A. Meadows, R. Huang, **T. C. Hazen**, and J. D. Keasling. Contributed. Investigation of the Central Metabolic Pathways of *Desulfovibrio vulgaris* Hildenborough Using a Minimal Medium with <sup>13</sup>C Labeled Lactate. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
  234. Chivian\*, D., E. J. Alm, F. J. Brockman, E. L. Brodie, D. E. Culley, T. Gihring, A. Lapidus, L-H. Lin, D. P. Moser, P. Richardson, A. P. Arkin, **T. C. Hazen**, and T. C. Onstott. Invited. Environmental Genomic Characterization of a Deep Subsurface Microorganism. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
  235. Alm\*, E. J., S. E. Borglin, S. C. Chhabra, S. P. Gaucher, M. Hadi, **T. C. Hazen**, Q. He, H-Y. Holman, K. H. Huang, R. Huang, Z. He, D. C. Joyner, J. D. Keasling, M. Keller, K. Keller, A. Mukhopadhyay, A. Redding, A. Singh, D. D. Stahl, S. Stolyar, Z. Yang, J. Wall, G. Zane, J. Zhou, and A. P. Arkin. Comparative Analysis of Bacterial Gene Expression in Response to Environmental Stress. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.

236. Yen\*, H-C. B., E. Alm, K. Huang, **T. C. Hazen**, A. P. Arkin, J. Zhou, J. D. Wall. Response of *Desulfovibrio vulgaris* to Acid Medium. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
237. Chakraborty\*, R., E. L. Brodie, R. Phan, D. Joyner, Y. Piceno, G. L. Andersen, M. S. Humphrys, T. H. Hazen, P. Sobecky, and **T. C. Hazen**. Diversity of Sulfate-Reducing Bacteria Isolated from the Katrina Floodwaters in New Orleans. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
238. Hemme\*, C. L., K. Bender, H. C. Yen, Z. Yang, D. Joyner, J. Jacobsen, Z. He, K. Huang, E. Alm, **T. C. Hazen**, A. Arkin, J. Zhou, and J. D. Wall. Characterization of a *Desulfovibrio vulgaris* Hildenborough Mutant Strain Lacking the Ferric Uptake Regulator (*fur*) Gene. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
239. He\*, Z., Q. He, E. J. Alm, J. D. Wall, M. W. Fields, **T. C. Hazen**, A. P. Arkin, and J. Zhou. Contributed. Exploration of salt adaptation mechanisms in *Desulfovibrio vulgaris* Hildenborough. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
240. He\*, Q., W. Chen, Z. He, Z. Yang, E. J. Alm, K. H. Huang, H.-C. Yen, D. C. Joyner, M. Keller, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Contributed. Nitrate stress response in *Desulfovibrio vulgaris* Hildenborough: Whole-Genome Transcriptomics and proteomics analyses. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
241. Chakraborty\*, R., D. Joyner, E. Wozei, H. -Y. Holman, S. P. Lam, and T. C Hazen. Contributed. *Desulfovibrio* strain PCS, a novel metal reducing pleomorphic sulfate reducing bacterium. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
242. Hazen\*, T. C., B. Faybishenko, E. Brodie, D. Joyner, S. E. Borglin, R. Chakraborty, M. Conrad, T. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Contributed. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
243. Joyner\*, D., A. Mukhopadhyay, R. Chakraborty, S. E. Borglin, and **T. C. Hazen**. Contributed. Anaerobic Phenotype Microarray Method for Knockout Mutant Comparison. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
244. Borglin\*, S. E., M. E. Conrad, E. Brodie, K. N. Woods, B. Faybishenko, D. Joyner, and **T. C. Hazen**. Contributed. Assessment of Bioreduction of Cr(VI) Using <sup>13</sup>C-PLFA analysis. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
245. Klonowska\*, A., Z. He, Q. He, **T. C. Hazen**, S. B. Thieman, E. J. Alm, A. P. Arkin, J. D. Wall, J. Zhou, and M. W. Fields. Contributed. Global Transcriptomic Analysis of Chromium(VI) Exposure of *Desulfovibrio vulgaris* Hildenborough under Sulfate-Reducing Conditions. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
246. Chhabra\*, S., S. Gaucher, G. Zane, E. L. Alm, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and A. Singh. Contributed. Investigation of Protein-Protein Interactions in the Metal-Reducing Bacterium *Desulfovibrio vulgaris*. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
247. Hemme\*, C. L., T. Gentry, L. Wu, M. W. Fields, K. Barry, C. Detter, C. Schadt, D. C. Bruce, D. Watson, **T. C. Hazen**, J. Tiedje, P. Richardson, E. Rubin, and J. Zhou. Contributed. Metagenomic Analysis of Uranium-Contaminated Groundwater. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
248. Holman\*, H.-Y. N., E. Wozei, and **T. C. Hazen**. Contributed. Molecular Observations of Anaerobes in Atmospheric Oxygen. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
249. Stolyar\*, S., Q. He, E. L. Alm, K. Huang, K. L. Hillesland, **T. C. Hazen**, S. E. Borglin, D. Joyner, A. P. Arkin, J. Zhou, and D. Stahl. Contributed. Genome wide gene expression analysis of response of *Desulfovibrio vulgaris* to high pH. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
250. Elias, D., I. B. Hilton\*, G. M. Zane, **T. C. Hazen**, M. D. Biggin, and J. D. Wall. Contributed. High-throughput Identification of Multi-protein Complexes via TAP tagging in *Desulfovibrio vulgaris*. May 2006, Orlando, FL. American Society for Microbiology Annual Meeting.
251. Long\*, P. E., **T. C. Hazen**, B. Faybishenko, E. Brodie, D. Joyner, S. Borglin, R. Chakraborty, M. Conrad, T. K. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, D. R. Newcomer, A. Willett, and S. Koenigsberg. Invited. Field Investigations of Lactate-Stimulated Bioreduction of Cr(VI) to Cr(III) at Hanford 100-H Area. April 2006, Richland, WA. Invited presentation to the Hanford Site Unit Manager Meeting.
252. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. April 2006, Miami, OH. Orton K. Stark General Lecture, Miami University.
253. **Hazen, T. C.** Invited. Bioremediation: Cleaning up using Natures Natural Cleansing Capacity. April 2006, Miami, OH. Orton K. Stark General Lecture, Miami University.

254. Zhou\*, J., T. Gentry, C. Hemme, L. Wu, M. W. Fields, C. Detter, K. Barry, D. Watson, C. W. Schadt, P. Richardson, **T. C. Hazen**, J. Tiedje, and E. Rubin. Contributed. Metagenomic Analysis of Microbial Communities in Uranium-contaminated Groundwaters. April 2006, Halifax, Canada. Microbial Genomes Conference 2006.
255. Tokunaga\*, T. K., J. Wan, M. K. Firestone, and **T. C. Hazen**. Invited. Mesoscale Biotransformation of Uranium. April 2006, Warrenton, VA. DOE ERSP annual workshop.
256. **Hazen, T. C.** Invited. Stimulating the Microbial Reduction of Chromium. April 2006, Warrenton, VA. DOE ERSP annual workshop.
257. Clark\*, M. E., Q. He, Z. He, K. H. Huang, E. J. Alm, X. Wan, **T. C. Hazen**, A. P. Arkin, J. D. Wall, J. Zhou, and M. W. Fields. Invited. Construction of Whole Genome Microarrays, and Expression Analysis of *Desulfovibrio vulgaris* Cells in Metal-Reducing Conditions: Temporal Transcriptomic Analysis of *Desulfovibrio vulgaris* Hildenborough Transition into Stationary Phase during Electron Donor Depletion. April 2006, Warrenton, VA. DOE ERSP annual workshop.
258. Hazen\*, T. C., B. Faybishenko, E. Brodie, D. Joyner, S. Borglin, R. Chakraborty, M. Conrad, T. K. Tokunaga, J. Wan, S. Hubbard, K. Williams, J. Peterson, M. Firestone, G. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Invited. Long-Term Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical and Microbiological Response to Slow Release Electron Donor. April 2006, Warrenton, VA. DOE ERSP annual workshop.
259. **Hazen, T. C.** Invited. Omics and Bioremediation Breakout Session. April 2006, Warrenton, VA. DOE ERSP annual workshop.
260. **Hazen, T. C.** Invited. Genomics:GTL and ERSP. April 2006, Warrenton, VA. DOE ERSP annual workshop.
261. Chivian\*, D., E. J. Alm, F. J. Brockman, E. L. Brodie, D. E. Culley, T. Gihring, A. Lapidus, L-H. Lin, D. P. Moser, P. Richardson, A. P. Arkin, **T. C. Hazen**, and T. C. Onstott. Environmental Genomic Characterization of a Deep Subsurface Microorganism. March 2006, Walnut Creek, CA. JGI Users Meeting.
262. Zhou\*, J., T. Gentry, C. Hemme, L. Wu, M. W. Fields, C. Detter, K. Barry, D. Watson, C. W. Schadt, P. Richardson, **T. C. Hazen**, J. Tiedje, and E. Rubin. Contributed. Metagenomic Analysis of Microbial Communities in Uranium-contaminated Groundwaters. March 2006, Walnut Creek, CA. JGI Users Meeting.
263. **Hazen, T. C.** Invited. Engineered Microbial Systems. March 2006, Atlanta, GA. Georgia Tech Environmental Systems Microbiological Symposium.
264. Onstott\*, T. C., **T. C. Hazen**, E. J. Alm, A. P. Arkin, F. J. Brockman, E. L. Brodie, D. Chivan, D. E. Culley, T. Ghring, A. Lapidus, L.-H. Lin, D. P. Moser, and P. Richardson. Contributed. Metagenomic characterization of a deep subsurface microorganism. March 2006, Washington, DC. NASA Astrobiology. AbSciCon2006.
265. Hazen\*, T. C. and H. H. Tabak. Invited. Field Research on Bioremediation of Metal Contamination in Soils and Sediments. March 2006, San Diego, CA. The Sixteenth Annual AEHS Meeting and West Coast Conference on Soils, Sediments and Water.
266. **Hazen, T. C.** Moderator. Bioremediation Strategies for Contaminated Sediments. March 2006, San Diego, CA. The Sixteenth Annual AEHS Meeting and West Coast Conference on Soils, Sediments and Water.
267. Hazen\*, T. C., H.-Y. N. Holman, J. Keasling, A. Mukhopadhyay, S. Chhabra, T. Torok, J. D. Wall, and M. D. Biggin. Invited. Protein Complex Analysis Project (PCAP): High Throughput Identification and Structural Characterization of Multi-Protein Complexes during Stress Response in *Desulfovibrio vulgaris*: Microbiology Subproject. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
268. Biggin\*, M. D., D. Elias, S. Chhabra, H.-Y. Holman, J. Keasling, A. Mukhopadhyay, T. Torok, J. Wall, **T. C. Hazen**, M. Dong, S. Hall, B. K. Jap, J. Jin, S. Fisher, P. J. Walian, H. E. Witkowska, M. Auer, R. M. Glaeser, J. Malik, J. P. Remis, D. Typke, K. H. Downing, A. P. Arkin, S. E. Brenner, J. Jacobsen, and J.-M. Chandonia. Invited. Protein Complex Analysis Project (PCAP): High Throughput Identification and Structural Characterization of Multi-Protein Complexes during Stress Response in *Desulfovibrio vulgaris*: Project Overview. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
269. Wall\*, J. D., H.-C. Yen, E. C. Drury, A. Mukhopadhyay, S. Chhabra, Q. He, M. W. Fields, A. Singh, J. Zhou, **T. C. Hazen**, and A. P. Arkin. Invited. Evaluation of stress responses in sulfate-reducing bacteria through genome analysis: identification of universal responses. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
270. Wyborski, D. L., C. B. Abulencia, J. A. Garcia, M. Podar, W. Chen, S. H. Chang, H. W. Chang, **T. C. Hazen**, M. Keller\*. Invited. Environmental Whole-Genome Amplification to Access Microbial Diversity in Contaminated Sediments. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
271. Mukhopadhyay, A., E. J. Alm, A. P. Arkin, E. E. Baidoo, P. I. Benke, S. E. Borglin, W. Chen, S. Chhabra, M. W. Fields, S. P. Gaucher, A. Gilman, M. Hadi, **T. C. Hazen**, Q. He, H.-Y. Holman, K. Huang, R. Huang, Z. He, D. C. Joyner, M. Keller, K. Keller, P. Oeller, F. Pingitore, A. Redding, A. Singh, D. Stahl, S. Stolyar, J. Sun, Z. Yang, J. D. Wall, G. Zane, J. Zhou, and J. D. Keasling\*. Invited. VIMSS Functional Genomics Core Research on Stress

- Response Pathways in Metal-Reducers. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
272. Clark, M. E., Q. He, Z. He, K. H. Huang, E. J. Alm, X. Wan, **T. C. Hazen**, A. P. Arkin, J. D. Wall, J. Zhou, J. Kurowski, A. Sundararajan, A. Klonowska, D. Klingeman, T. Yan, M. Duley, and M. W. Fields\*. Invited. Temporal Transcriptomic Analysis of *Desulfovibrio vulgaris* Hildenborough Transition into Stationary-Phase Growth during Electron Donor Depletion. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  273. Gaucher, S., M. Hadi, S. Chhabra, E. Alm, G. Zane, D. C. Joyner, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and A. Singh\*. Invited. Investigation of Protein-Protein Interactions in the Metal-Reducing Bacterium *Desulfovibrio vulgaris*. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  274. Abulencia, C., E. Alm, G. Anderson, A. P. Arkin\*, K. Bender, S. Borglin, E. Brodie, R. Chakraborty, S. Chhabra, S. van Dien, I. Dubchak, M. Fields, S. Gaucher, J. Geller, M. Hadi, **T. C. Hazen**, Q. He, Z. He, H.-Y. Holman, K. Huang, R. Huang, J. Jacobsen, D. Joyner, J. Keasling, K. Keller, M. Keller, A. Mukhopadhyay, R. Phan, M. Price, J. A. Ringbauer, Jr., A. Singh, D. Stahl, S. Stolyar, J. Sun, D. Thompson, C. Walker, J. Wall, J. Wei, D. Wolf, D. Wyborski, H.-C. Yen, G. Zane, J. Zhou, and B. Zuniga. Invited. The Virtual Institute of Microbial Stress and Survival (VIMSS): Deduction of Stress Response Pathways in Metal/Radionuclide Reducing Microbes. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  275. Hazen\*, T. C., C. Abulencia, G. L. Anderson, S. E. Borglin, E. Brodie, S. van Dien, M. Fields, J. Geller, H.-Y. Holman, R. Huang, R. Phan, E. Wozel, J. Jacobsen, D. Joyner, R. Chakraborty, M. Keller, A. Mukhopadhyay, D. Stahl, S. Stolyar, J. D. Wall, D. Wyborski, H.-C. Yen, G. Zane, J. Zhou, E. Hendrickson, T. Lie, J. Leigh, and C. Walker. Invited. VIMSS Applied Environmental Microbiology Core Research on Stress Response Pathways in Metal-Reducers. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  276. Alm\*, E. J., E. E. Baidoo, P. I. Benke, S. E. Borglin, W. Chen, S. Chhabra, M. W. Fields, S. P. Gaucher, A. Gilman, M. Hadi, **T. C. Hazen**, Q. He, H.-Y. Holman, K. Huang, R. Huang, Z. He, D. C. Joyner, J. D. Keasling, M. Keller, K. Keller, A. Mukhopadhyay, P. Oeller, F. Pingitore, A. Redding, A. Singh, D. Stahl, S. Stolyar, J. Sun, Z. Yang, J. D. Wall, G. Zane, J. Zhou, and A. P. Arkin. Invited. Comparative Analysis of Bacterial Gene Expression in Response to Environmental Stress. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  277. Li\*, T., J. Guo, D. Klingeman, L. Wu, X. Liu, T. Yan, Y. Xu, A. Beliaev, Z. He, **T. C. Hazen**, A. P. Arkin, and J. Zhou. Invited. H<sub>2</sub>O<sub>2</sub>-Induced Stress Responses of *Shewanella oneidensis* MR-1. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  278. Zhou\*, J., T. Gentry, C. Hemme, L. Wu, M. W. Fields, C. Detter, K. Barry, D. Watson, C. W. Schadt, P. Richardson, J. Bristow, **T. C. Hazen**, J. Tiedje, and E. Rubin. Invited. Metagenomic Analysis of Microbial Communities in Uranium-Contaminated Groundwaters. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  279. He\*, Q., Z. He, W. Chen, Z. Yang, E. J. Alm, K. H. Huang, H.-C. Yen, D. C. Joyner, M. Keller, J. Keasling, A. P. Arkin, **T. C. Hazen**, J. D. Wall, and J. Zhou. Invited. Nitrate stress response in *Desulfovibrio vulgaris* Hildenborough: Whole-Genome Transcriptomics and proteomics analyses. February 2006, Washington, DC. DOE Genomics:GTL Annual Workshop.
  280. **Hazen, T. C.** Invited. Microbial Ecology in the deep subsurface. February 2006, Lead, SD. NSF Deep Underground Science and Engineering Lab Workshop.
  281. **Hazen, T. C.** Invited. Tutorial on Systems Biology and Bioremediation. January 2006, Winston-Salem, NC. Wake Forest University
  282. **Hazen, T. C.** Invited. Integrated Omics in Systems Biology: The New Frontier for Environmental Biotechnology, Ecology and Evolution. January 2006, Winston-Salem, NC. Wake Forest University.
  283. Hubbard\*, S., J. Peterson, J. Chen, K. Williams, M. Conrad, B. Faybishenko, A. Willet, P. Long, and **T. C. Hazen**. Contributed. Geophysical Monitoring of Cr(VI) bioreduction at the Hanford 100H Site. December 2005, San Francisco, CA. Annual Meeting of the American Geophysical Union.
  284. \_\_\_\_\_. Newspaper. Today at Berkeley Lab. Volunteers make 'Edge' big success. <http://www.lbl.gov/today/> November 3, 2005.
  285. **Hazen, T. C.** Invited. VIMSS linkage to NABIR FRC. October 2005, Oak Ridge, TN. Annual NABIR FRC Workshop.
  286. Wyborski, D. L., C. B. Abulencia, B. Buchner, D. Burton, C. Chang, J. Garcia, **T. C. Hazen**, K. Obokata, M. Podar, T. Torok, and M. Keller. Contributed. Analysis of Organisms Surviving in Highly Contaminated Environments. October 2005, Oak Ridge, TN. Annual NABIR FRC Workshop.
  287. **Hazen, T. C.** Invited. Integration of the Omics, Bioinformatics, and Biogeochemistry in Groundwater Remediation. October 2005, San Diego, CA. International Conference on Safe Water, Exploring Global Demands and Impacts of Natural Disasters, SAFEWATER 2005.

288. Conrad\*, M. E., S. E. Borglin, E. Brodie, K. N. Woods, B. Faybishenko, **T. C. Hazen**, P. E. Long, and A. Willett. Contributed. Quantification of enhanced bioreduction of Cr(VI) using <sup>13</sup>C-PLFA monitoring coupled with advance microbiological techniques. October 2005, Salt Lake City, UT. Annual Meeting Geological Society of America.
289. **Hazen, T. C.** Invited. Omics and Biogeochemistry: The New Frontier for Environmental Biotechnology (Lab to the Field and back). October 2005, Berkeley, CA. Department of Plant and Microbial Biology, University of California at Berkeley.
290. **Hazen, T. C.** Invited Plenary. Environmental Biotechnology and Bioremediation. October 2005, Warrenton, VA. 2005 ASTAR National Boot Camp for Maryland and Ohio ASTA Resource Judges and Guest Jurists, The Language of the Life Sciences at the Airlie Conference Center.
291. **Hazen, T. C.** Invited. Intimate Strangers: The Anatomy, Ecology & Engineering of Microorganisms. October 2005, Warrenton, VA. 2005 ASTAR National Boot Camp for Maryland and Ohio ASTA Resource Judges and Guest Jurists, The Language of the Life Sciences at the Airlie Conference Center.
292. **Hazen, T. C.** Panel Interlocutor. Biological Agents: Threat, Preparedness, Response and Myths. October 2005, Warrenton, VA. 2005 ASTAR National Boot Camp for Maryland and Ohio ASTA Resource Judges and Guest Jurists, The Language of the Life Sciences at the Airlie Conference Center.
293. Posner, M. Newspaper. ....At Lawrence Berkeley. Weapons Complex Monitor: Waste Management and Cleanup 16:11. October 24, 2005.
294. Yarris, L. Newspaper. DNA Chip Scans for Disease-Causing Microbes. Berkeley Lab VIEW 3 (17): 5. October 14, 2005
295. ----. Newspaper. Bissell and Hazen Honored as BER Distinguished Scientists. Berkeley Lab VIEW 3(17):7. October 14, 2005
296. Woodruff, A. Newspaper. Device Exposes Katrina's Bacteria. Picture and article featuring T. Hazen and G. Andersen. The Daily California. October 12, 2005. Berkeley, CA.
297. Posner, M. Newspaper. LBNL Bioremediation Experiments show promise in Hanford 100-H Area. Weapons Complex Monitor: Waste Management and Cleanup 16:12. October 10, 2005.
298. \_\_\_\_ Newspaper. Today at Berkeley Lab. Bioremediation, Breast Cancer Work Awarded. <http://www.lbl.gov/today/> October 4, 2005.
299. \_\_\_\_ Newspaper. Today at Berkeley Lab. 'Phylochip' Scans Flood Areas for Contaminants. <http://www.lbl.gov/today/> September 28, 2005.
300. Hazen\*, T. C., E. Brodie, F. Brockman, D. Moser, T. Gihring, D. Culley, L-H. Lin, T. Pray, G. Andersen, P. Richardson, L. Pratt, and T. C. Onstott. Contributed. Comparison of planktonic and biofilm microbial communities in million year old fissure water from a deep subsurface gold mine. August 2005, Jackson Hole, WY. International Symposium Subsurface Microbiology.
301. **Hazen, T. C.** Moderator. Molecular Biology Characterization of Subsurface Microbial Communities. August 2005, Jackson Hole, WY. International Symposium Subsurface Microbiology.
302. Brodie, E. L.\*, T. Z. DeSantis, J. P. Moberg, I. X. Zubieta, Y. M. Piceño, **T. C. Hazen**, and G. L. Andersen. Contributed. A High Density Microarray for Rapid Profiling of 16S rDNA and 16S rRNA of Prokaryotic Communities. August 2005, Jackson Hole, WY. International Symposium Subsurface Microbiology.
303. Hazen\*, T. C., B. Faybishenko, E. Brodie, D. Joyner, S. E. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. M. Wan, S. Hubbard, K. Williams, J. Peterson, M. K. Firestone, G. L. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Contributed. Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical Response to Slow Release Electron Donor. July 2005, San Francisco, CA. International Union of Microbiological Societies.
304. Brodie\*, E., **T. C. Hazen**, B. Faybishenko, D. Joyner, S. Borglin, M. Conrad, G. Andersen, T. DeSantis, P. Long, D. Newcomer, A. Willett, and S. Koenigsberg. Contributed. Chromium Bio-Immobilization at the Hanford 100H site: Comprehensive Molecular Analysis of Microbial Population Dynamics. July 2005, San Francisco, CA. International Union of Microbiological Societies.
305. **Hazen, T. C.** Invited. The Impact of Environmental Biotechnology in Bioremediation – The Dawning of the “Age of Omics”. July 2005, Berkeley, CA. LBNL Center for Environmental Biotechnology Summer Student Seminar.
306. **Hazen, T. C.** Invited. In situ bioremediation and applicability to geobioreactors. July 2005, Denver, CO. Luca Technologies.
307. **Hazen, T. C.** Invited. Bioremediation technologies for petroleum. June 2005, Usinsk, Russia. LuK Oil Company.
308. **Hazen, T. C.** Invited. Evaluation of sorption/bioremediation product application. June 2005, Syktyvkar, Russia. Institute of Biology, Komi Republic.
309. **Hazen, T. C.** Invited. Evaluation of sorption/bioremediation product application. June 2005, Moscow, Russia. International Science & Technology Center.

310. **Hazen, T. C.** Invited. The Impact of Environmental Biotechnology in Bioremediation – The Dawning of the “Age of Omics”. June 2005, Baltimore, MD. Eighth International Conference on In Situ and On-Site Bioremediation.
311. **Hazen, T. C.**, B. Faybishenko, E. Brodie, D. Joyner, S. E. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. M. Wan, S. Hubbard, K. Williams, J. Peterson, M. K. Firestone, G. L. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Contributed. Chromium Bio-Immobilization at the Hanford 100H Site: Geochemical Response to Slow Release Electron Donor. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
312. Chhabra\*, S. R., Q. He, Z. He, S. Gaucher, E. Alm, M. Hadi, A. P. Arkin, **T. C. Hazen**, J. Zhou, and A. K. Singh. Contributed. Analysis of the heat shock response in *Desulfovibrio vulgaris* through global proteomics and transcriptomics studies. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
313. Brodie\*, E., **T. C. Hazen**, B. Faybishenko, D. Joyner, S. Borglin, M. Conrad, G. Andersen, T. DeSantis, P. Long, D. Newcomer, A. Willett, and S. Koenigsberg. Contributed. Chromium Bio-Immobilization at the Hanford 100H site: Comprehensive Molecular Analysis of Microbial Population Dynamics. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
314. Ringbauer, Jr., J. A., R. B. Payne, H. Zhili, H. Qiang, W. Liyou, Z. Jizhong, M. W. Fields, E. Alm, K. Huang, **T. C. Hazen**, A. Arkin, and J. D. Wall. Contributed. Transposon Mutagenesis of *Desulfovibrio vulgaris* Yields Insight into Sodium and pH Stresses. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
315. Wyborski, D. L., C. B. Abulencia, B. Buchner, D. Burton, C. Chang, J. Garcia, **T. C. Hazen**, K. Obokata, M. Podar, T. Torok, and M. Keller. Contributed. Analysis of Organisms Surviving in Highly Contaminated Environments. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
316. He\*, Q., Z. He, K. H. Huang, E. J. Alm, A. P. Arkin, J. D. Wall, **T. C. Hazen**, M. W. Fields, and J. Zhou. Contributed. Whole-Genome Transcriptional Response of *Desulfovibrio vulgaris* to Nitrite. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
317. He\*, Q., Z. He, L. Wu, A. P. Arkin, **T. C. Hazen**, J. D. Wall, M. W. Fields, D. A. Stahl, and J. Zhou. Contributed. Transcriptional Gene Expression Analysis of the Response to Acetone in *Desulfovibrio vulgaris* Using Whole-Genome Oligonucleotide Microarrays. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
318. Alm, E., A. Arkin\*, **T. C. Hazen**, J. Keasling, M. Keller, A. Mukhopadhyay, A. Singh, D. Stahl, D. Thompson, J. Wall, and J. Zhou. Contributed. A Powerful Integrated Approach to the Systems-Level Response of Bacteria to Environmental Stress. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
319. Huang\*, R., D. Joyner, S. Borglin, **T. C. Hazen**, and N. Katz. Contributed. Large Scale Biomass Production of Obligate Anaerobes for Simultaneous Transcriptomics, Proteomics, Metabolomics, and Lipidomics Analysis. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
320. Holman\*, H-Y. N., L. R. Comolli, E. Wozel, **T. C. Hazen**, and K. H. Downing. Contributed. Real-Time Observations of Chemical and Structural Aspects of *Desulfovibrio vulgaris* and *Caluobacter crescentis* in Atmospheric Oxygen. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
321. Barua\*, S., C. McAlvin, C. Hemme, S. Borglin, Y. Yang, D. Thompson, T. Hazen, J. Zhou. Contributed. Role of a LysR Family Transcriptional Regulator in Response to Osmotic Stress in *Shewanella oneidensis* MR1. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
322. Holman\*, H-Y. N., S. E. Borglin, **T. C. Hazen**, D. Joyner, R. Huang, N. Katz, and E. Wozel. Contributed. Spectral Comparisons Reveal General Stress Response Strategies in *Desulfovibrio vulgaris*. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
323. Fields\*, M. W., T. Yan, X. Liu, C. E. Bagwell, S. L. Carroll, P. M. Jardine, D. B. Watson, C. S. Criddle, **T. C. Hazen**, and J. Zhou. Contributed. Identification of Different Relationships Between Contaminated Groundwater Samples Based Upon Extensive Geochemical Data or Multiple Gene Sequences from Microbial Communities. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
324. Clark\*, M. E., Z. He, Q. He, L. Wu, J. D. Wall, **T. C. Hazen**, J. Zhou, and M. W. Fields. Contributed. Whole-Genome Transcriptional Response of *Desulfovibrio vulgaris* Hildenborough to Nitrite. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
325. Borglin\*, S. E., **T. C. Hazen**, E. Alm, D. Joyner, R. Huang, N. K. Katz. Contributed. Phospholipid Fatty Acid Analysis as Phenotypic Indicators of Common Stress Response Pathways in *Desulfovibrio vulgaris* and *Shewanella oneidensis*. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
326. Borglin\*, S. E., **T. C. Hazen**, J. Carlson, J. D. Wall, and D. Joyner. Contributed. Phenotypic Microarray Analysis of *Desulfovibrio vulgaris*. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
327. Stolyar\*, S., C. Walker, H.-C. Yenc, B. Zuniga, N. Pinel, H. Gough, Z. He, Q. He, J. Zhou, **T. C. Hazen**, S. E. Borglin, J. D. Wall, and D. A. Stahl. Contributed. Genomic and physiological characterization of *Desulfovibrio vulgaris* strains isolated from a metal contaminated lake. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.

328. Katz\*, N., **T. C. Hazen**, R. Huang, D. Joyner, and S. E. Borglin. Contributed. High Throughput Analysis of Stress Growth Response in *Shewanella oneidensis* MR-1. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
329. He\*, Z., Q. He, E. J. Alm, J. D. Wall, M. W. Fields, **T. C. Hazen**, A. P. Arkin, and J. Zhou. Contributed. Adaptation of *Desulfovibrio vulgaris* to Elevated NaCl Conditions. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
330. Geller\*, J., **T. C. Hazen**, R. Huang, D. Joyner, and S. E. Borglin. Contributed. Characterization of *Desulfovibrio vulgaris* Grown in Extremophile Turbidostat Reactors. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
331. Fields\*, M. W., M. E. Clark, Z. He, Q. He, L. Wu, J. D. Wall, **T. C. Hazen**, and J. Zhou. Contributed. Whole-Genome Expression Analysis of *Desulfovibrio vulgaris* Cells Throughout Exponential Phase into Stationary Phase Growth in a Defined Medium. June 2005, Atlanta, GA. Annual Meeting American Society for Microbiology.
332. **Hazen, T. C.** Invited. Integration of the Ecogenomics, Proteomics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. April 2005, Durham, NH. University of New Hampshire.
333. **Hazen, T. C.**, and L. Krumholz. Invited Workshop. What changes in microbial community structure can be expected during and after biostimulation. April 2005, Warrenton, VA. DOE NABIR Annual Investigators Meeting.
334. **Hazen, T. C.** Invited Presentation. Field-Integrated Studies of Long-Term Sustainability of Chromium Bioreduction at the Hanford 100H Site. April 2005, Warrenton, VA. DOE NABIR Annual Investigators Meeting.
335. He, Z., M. E. Clark, Q. He, L. Wu, J. D. Wall, **T. C. Hazen**, J. Zhou, and M. W. Fields. Invited. Field-Integrated Construction of Whole Genome Microarrays, and Expression Analysis of *Desulfovibrio vulgaris* Cells under Metal-Reducing Conditions. April 2005, Warrenton, VA. DOE NABIR Annual Investigators Meeting.
336. Tokunaga, J. Wan, **T. C. Hazen**, M. Firestone, E. Brodie, Z. Zheng, J. Larsen, and D. Herman. Invited. Mesoscale Biotransformation of Uranium. April 2005, Warrenton, VA. DOE NABIR Annual Investigators Meeting.
337. **Hazen, T. C.**, B. Faybishenko, E. Brodie, D. Joyner, S. E. Borglin, J. Hanlon, M. Conrad, T. Tokunaga, J. M. Wan, S. Hubbard, K. Williams, J. Peterson, M. K. Firestone, G. L. Andersen, T. DeSantis, P. E. Long, D. R. Newcomer, A. Willett, and S. Koenigsberg. Invited. Field-Integrated Studies of Long-Term Sustainability of Chromium Bioreduction at the Hanford 100H Site. April 2005, Warrenton, VA. DOE NABIR Annual Investigators Meeting.
338. Brockman\*, F., D. Moser, T. Gihring, D. Culley, E. Brodie, G. Andersen, **T. C. Hazen**, P. Richardson, L. Pratt, and T. C. Onstott. Contributed. Inferred bioenergetics of an uncultured bacterium common in fracture fluids of South African deep mines. April 2005, Boulder, CO. NAI (NASA Astrobiology Institute) 2005 Biennial Meeting.
339. **Hazen, T. C.** Invited. Integration of the Ecogenomics, Proteomics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. March 2005, Santa Barbara, CA. University of California at Santa Barbara, Bren School of Engineering.
340. **Hazen, T. C.** Invited. Integration of the Omics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. March 2005, Palo Alto, CA. Stanford University, Department of Civil and Environmental Engineering.
341. **Hazen, T. C.** Invited. Integration of the Omics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. March 2005, San Diego, CA. 15th Annual AEHS West Coast Conference on Soils, Sediments, and Water.
342. **Hazen, T. C.** Invited Workshop. Bioremediation of Metals and Radionuclides at DOE Sites. January 2005, Phoenix, AZ. Consensus Conference to Characterize Regulatory Concerns Regarding Bioremediation of Radionuclides and Heavy Metals in Mixed Wastes at Doe Sites.
343. **Hazen, T. C.** Invited Workshop. Biopile Case Studies for landfills and petroleum contaminated soils. November 2004, Milan, Italy. On site remediation technologies: engineering of soil washing, land farming and biopile applications.
344. **Hazen, T. C.** Invited. Ecogenomics and Phenomics the New Frontier in Bioremediation of Toxic Waste Sites. November 2004, Berkeley, CA. LBNL Life Sciences & Genomics Seminar Series.
345. **Hazen, T. C.** Invited Keynote. Integration of Ecogenomics, Phenomics, Transcriptomics, Proteomics, Lipidomics, Metabolomics, Fluxomics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. November 2004, Seattle, WA. NIH/EPA Annual Superfund Research Meeting.
346. **Hazen, T. C.** Invited Dinner Talk. Risk and Environmental Cleanup, some Global Issues. September 2004, Berkeley, CA. Workshop on Oral Bioavailability of Organic Compounds.
347. **Hazen, T. C.**, and A. P. Arkin. Invited. Roundtable on Rapid Deduction of Stress Response Pathways in Metal-Reducing Bacteria: Ecology, Functional Genomics, and Bioinformatics. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10.
348. Brodie\*, E., J. Larsen, **T. C. Hazen**, J. M. Wan, T. K. Tokunaga, D. Joyner, G. L. Andersen, T. DeSantis, P. Richardson, and M. Firestone. Contributed. High-density oligonucleotide array monitoring of bacterial

- community dynamics during carbon stimulated uranium bioremediation. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. (LBNL-54787 Abs.)
349. Wan\*, J. M., T. K. Tokunaga, J. Larson, Z. Zheng, **T. C. Hazen**, D. Herman, E. Brodie, M. K. Firestone. Contributed. Oxidation of bioreduced Uranium under reducing conditions. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. ()
350. Tokunaga, T. K., J. Wan, J. Pena, E. Brodie, M. K. Firestone, **T. C. Hazen**, and S. R. Sutton. Contributed. Uranium bioreduction dynamics in low permeability sediments. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. ()
351. Fields\*, M. W., T. Yan, X. Liu, C. E. Bagwell, S. L. Carroll, P. M. Jardine, C. S. Criddle, **T. C. Hazen**, and J. Zhou. Contributed. Polyphasic characterization of microbial communities under the stressful conditions of nitrate, heavy metals, radionuclides, and acidic pH in contaminated groundwater. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. (LBNL-54788 Abs.)
352. Holman, H.-Y., Z. Lin, **T. C. Hazen\***, and D. C. Joyner. Contributed. A real-time investigation of *Desulfovibrio vulgaris* response to oxygen stress. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. (LBNL-54807 Abs.)
353. Borglin\*, S. E., **T. C. Hazen**, D. C. Joyner, and R. Huang. Contributed. Effects of Environmental stressors on Signature Lipid Biomarkers in *Desulfovibrio vulgaris*. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. (LBNL-54809 Abs.)
354. Hazen\*, T. C., D. Joyner, S. Borglin, B. Faybishenko, J. Wan, T. Tokunaga, S. Hubbard, K. Williams, M. Conrad, C. Rios-Velazquez, J. Malave-Orengo, R. Martinez-Santiago, M. Firestone, E. Brodie, P. E. Long, E. Willett, and S. Koenigsberg. Contributed. Functional Microbial Changes During Lactate and HRC-Stimulated Bioreduction of Cr(VI) in Hanford 100H Sediments. August 2004, Cancun, Mexico. International Symposium on Microbial Ecology - 10. (LBNL-54808 Abs.)
355. **Hazen, T. C.**, and A. P. Arkin. Invited. Workshop on Stress in Metal-Reducing Bacteria: Ecology, Functional Genomics, and Bioinformatics. July 2004, Anaheim, CA. Society for Industrial Microbiology Annual Meeting.
356. **Hazen, T. C.** Invited. Recent Advances in Bioremediation. July 2004, Berkeley, CA. CEB Summer Student Lectures.
357. **Hazen, T. C.** Invited Keynote. Recent Advances in Bioremediation. June 2004, Chicago, IL. Seventh Biennial Symposium of the International Society of Environmental Biotechnology.
358. \_\_\_\_\_. Newspaper. Today at Berkeley Lab. BIO 2004 Includes Several from Lab. <http://www.lbl.gov/today/> June 3, 2004.
359. **Hazen, T. C.** Invited. Latest Advances in Environmental Biotechnology. June 2004, San Francisco, CA. BIO2004.
360. **Hazen, T. C.** Invited. Integration of Ecogenomics, Phenomics, Transcriptomics, Proteomics, Lipidomics, Metabolomics, Fluxomics, Bioinformatics, and Biogeochemistry: The New Frontier for Environmental Biotechnology. June 2004, Adelaide, Australia. Flinders University.
361. Martinez\*, R. E., C. Rios-Velazquez, G. L. Andersen, and **T. C. Hazen**. Contributed. Molecular Analysis of the Microbial Community Structure in Chromium Contaminated Sites before and after In Situ Bioreduction Stimulation by Lactate Injection. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54286 Abs.)
362. Malave\*, J., S. E. Borglin, C. Rios-Velazquez, and **T. C. Hazen**. Contributed. Study of Microbial Community Structure Using Phospholipid Fatty Acid Analysis (PLFA) at a Chromium Contaminated Site. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54287 Abs.)
363. He\*, Z., Q. He, L. Wu, J. D. Wall, **T. C. Hazen**, M. W. Fields, and J. Zhou. Contributed. Transcriptional Analysis of Responses of *Desulfovibrio vulgaris* to NaCl Stress Using Whole-Genome Oligonucleotide Microarrays. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54284 Abs.)
364. He\*, Q., Z. He, L. Wu, J. D. Wall, **T. C. Hazen**, M. W. Fields, and J. Zhou. Contributed. Global Transcriptional Analysis of *Desulfovibrio vulgaris* in Response to Nitrite Stress Using Whole-Genome Oligonucleotide Microarrays. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54285 Abs.)
365. Holman\*, H.-Y., Z. Lin, **T. C. Hazen**, and D. C. Joyner. Contributed. A real-time investigation of *Desulfovibrio vulgaris* response to oxygen stress. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54289 Abs.)
366. Brodie\*, E., **T. C. Hazen**, J. M. Wan, T. K. Tokunaga, J. Larsen, K. Olson, D. C. Joyner, and M. Firestone. Contributed. Biogeography of microbial communities associated with diffusion limited reduction of U(VI) and NO<sub>3</sub><sup>-</sup> as co-contaminants in natural sediments and soils. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54232 Abs.)

367. Joyner\*, D. C., S. E. Borglin, R. Huang, **T. C. Hazen**, J. D. Wall, H.-C. Yen, and S. M. Stolyar. Contributed. Chemically defined medium for *Desulfovibrio vulgaris* stress studies and biomass production. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54288 Abs.)
368. Borglin\*, S. E., **T. C. Hazen**, D. C. Joyner, and R. Huang. Contributed. Effects of Environmental stressors on Signature Lipid Biomarkers in *Desulfovibrio vulgaris*. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54235 Abs.)
369. **Hazen, T. C.**, D. Joyner, S. Borglin, B. Faybishenko, J. Wan, T. Tokunaga, S. Hubbard, K. Williams, M. Conrad, C. Rios-Velazquez, J. Malave-Orengo, R. Martinez-Santiago, M. Firestone, E. Brodie, P. E. Long, E. Willett, and S. Koenigsberg. Contributed. Functional Microbial Changes During Lactate and HRC-Stimulated Bioreduction of Cr(VI) in Hanford 100H Sediments. May 2004, New Orleans, LA. American Society for Microbiology Annual Meeting. (LBNL-54237 Abs.)
370. **Hazen, T. C.**, D. Joyner, S. Borglin, B. Faybishenko, M. Conrad, C. Rios-Velazquez, J. Malave-Orengo, R. Martinez-Santiago, M. Firestone, E. Brodie, P. E. Long, E. Willett, and S. Koenigsberg. Contributed. Functional Microbial Changes During Lactate and HRC-Stimulated Bioreduction of Cr(VI) in Hanford 100H Sediments. May 2004, Monterey, CA. International Conference on Chlorinated and Recalcitrant Compound Remediation.
371. **Hazen, T. C.**, D. Joyner, S. Borglin, B. Faybishenko, J. Wan, T. Tokunaga, S. Hubbard, K. Williams, M. Firestone, E. Brodie, P. E. Long, E. Willett, and S. Koenigsberg. Contributed. Field Investigations of HRC®-Stimulated Bioreduction of Cr(VI) at Hanford 100H. May 2004, Monterey, CA. International Conference on Chlorinated and Recalcitrant Compound Remediation.
372. Faybishenko\*, B., **T. C. Hazen**, S. Hubbard, M. Conrad, and J. Christensen. Invited. Strategy and Techniques for Monitoring Bioremediation of Metals in the Vadose Zone and Groundwater at Contaminated Sites. April 2004, Reston, VA. Workshop Long-Term Performance Monitoring of Metals and Radionuclides in the Subsurface: Strategies, Tools and Case Studies (DOE/USGS)
373. **Hazen, T. C.** Invited. From Sequence to Integration of Genomics, Proteomics, Metabolomics, Bioinformatics and Ecology: The New Frontier of Science. April 2004, San Juan, PR. University of Puerto Rico.
374. **Hazen, T. C.** Invited. Virtual Institute for Microbial Stress and Survival: Rapid Deduction of Stress Response Pathways. April 2004, Bayamon, PR. University of Puerto Rico.
375. **Hazen, T. C.** Invited. VIMSS: Rapid Deduction of Stress Response Pathways in Metal and Radionuclide Reducing Bacteria. March 2004, Warrenton, VA. NABIR Program Annual PI Meeting.
376. **Hazen, T. C.**, D. Joyner, S. Borglin, B. Faybishenko, J. Wan, T. Tokunaga, S. Hubbard, K. Williams, M. Conrad, C. Rios-Velazquez, J. Malave-Orengo, R. Martinez-Santiago, M. Firestone, E. Brodie, P. E. Long, E. Willett, and S. Koenigsberg. Invited. Field Investigations of HRC®-Stimulated Bioreduction of Cr(VI) at Hanford 100H. March 2004, Warrenton, VA. NABIR Program Annual PI Meeting.
377. Wan\*, J., T. K. Tokunaga, **T. C. Hazen**, M. K. Firestone, Z. Zhen, E. Brodie, J. Larsen, and D. Herman. Invited. Mesoscale Coupled Transport and Biogeochemical Effects on Reduction of U(VI) and NO<sub>3</sub><sup>-</sup> as Co-contaminants in Natural Sediments and Soils. March 2004, Warrenton, VA. NABIR Program Annual PI Meeting.
378. **Hazen, T. C.** Invited. An Overview of Environmental Biotechnology. March 2004, San Diego, CA. AEHS West Annual Symposium on Contaminated Soils.
379. **Hazen, T. C.** Newspaper article. Bacterias se tomaron encuentro de juices. March 2004, Concepcion, Chile. El Sur March 4, 2004 page 5.
380. **Hazen, T. C.** Invited Panelist. Round Table on Future of Biotechnologies. March 2004, Concepcion, Chile. Global Biotechnology Forum, United Nations Industrial Development Organization.
381. **Hazen, T. C.** Invited. A Scientific Briefing on Bioremediation. March 2004, Concepcion, Chile. March 2004, Concepcion, Chile. Global Biotechnology Forum, United Nations Industrial Development Organization.
382. **Hazen, T. C.** Invited. A Scientific Briefing on Bioremediation. March 2004, Concepcion, Chile. Global Biotechnology Forum, United Nations Industrial Development Organization.
383. **Hazen, T. C.** Invited. Biotechnology to Restore Fouled Environments. How may natural and genetically engineered organisms be used? March 2004, Concepcion, Chile. Global Biotechnology Forum, United Nations Industrial Development Organization.
384. **Hazen, T. C.** Invited Panelist. Plenary Case Scenario and Discussion. *Chile Pork Growers v. Alpha Food Laboratories\** - a biotechnology liability case. Global Biotechnology Forum, United Nations Industrial Development Organization.
385. **Hazen, T. C.** Invited Panelist. Plenary Case Scenario and Discussion. *People v Soderstein*, a food bioterrorism case. Global Biotechnology Forum, United Nations Industrial Development Organization.
386. **Hazen, T. C.** Invited. Genes and Bacteria. Why are bacteria important and what do they do? As life forms, how are they structured? March 2004, Concepcion, Chile. Global Biotechnology Forum, United Nations Industrial Development Organization.

387. **Hazen, T. C.**, H.-Y. Holman, S. E. Borglin, D. Joyner, R. Huang, Z. Lin, D. Stahl, S. M. Stolyar, M. Fields, D. Thompson, J. Zhou, J. D. Wall, H.-C. Yen, M. Keller. Invited. VIMSS Applied Environmental Microbiology Core Research on Stress Response Pathways in Metal-Reducers. February 2004, Arlington, VA. DOE Genomes to Life Workshop.
388. **Hazen, T. C.** Invited. An Overview of Environmental Biotechnology. October 2003, Amherst, MA. AEHS Annual Symposium on Contaminated Soils.
389. **Hazen, T. C.** Invited. Bioremediation: using biotechnology to cleanup toxic waste sites. October 2003, St. Louis, MO. Genetics and the International Court.
390. **Hazen, T. C.** Invited Keynote. Bioremediation and Natural Attenuation: Stewardship through Science. October 2003, Salt Lake City, UT. INRA Subsurface Science Conference.
391. **Hazen, T. C.** Invited. Bioremediation Overview. July 2003, Berkeley, CA. CEB Summer Student Lectures.
392. **Hazen, T. C.** Invited. Recent Advances in Environmental Biotechnology. June 2003, Washington, DC. BIO 2003 session on Environmental Biotechnology.
393. Brodie, E. I., M. K. Firestone, J. Pena, J. Larsen, **T. C. Hazen\***, T. Tokunaga, and J. Wan. Contributed. Bioreduction of Co-Contaminating Uranium and Nitrate: Carbon Release Rate Effects. June 2003, Orlando, FL. In Situ and On Site Bioremediation: The Sixth International Symposium.
394. **Hazen, T. C.**, S. E. Borglin, and C. M. Oldenburg. Contributed. Aerobic Landfill Bioremediation. June 2003, Orlando, FL. In Situ and On Site Bioremediation: The Sixth International Symposium.
395. **Hazen, T. C.** Invited. From Research to Practical Applications: Gaseous Nutrient Injection for in situ bioremediation of chlorinated solvents. May 2003, Washington, DC. American Society for Microbiology annual meeting.
396. **Hazen, T. C.** Invited. Bioremediation: using biotechnology to cleanup toxic waste sites. May 2003, Washington, DC. Genetics and the Court.
397. **Hazen, T. C.** Magazine Article Interview. Natural solutions to pollution by A. J. S. Rayl. April 7, 2003 The Scientist 17:22-25.
398. **Hazen, T. C.**, B. Faybishenko, J. Wan, T. Tokunaga, S. Hubbard, M. Firestone, P. E. Long, S. Koenigsberg. Invited. NABIR-EM Field Investigations of Lactate-Stimulated Bioreduction of Cr(VI) to Cr(III) at Hanford 100H. March 2003, Warrenton, VA. NABIR Program Annual PI Meeting.
399. Wan\*, J., T. K. Tokunaga, **T. C. Hazen**, M. K. Firestone, E. Brodie, Z. Zheng, J. Larsen, and J. Pena. Invited. Mesoscale Coupled Transport and Biogeochemical Effects on Reduction of U(VI) and NO<sub>3</sub><sup>-</sup> as Co-contaminants in Natural Sediments and Soils. March 2003, Warrenton, VA. NABIR Program Annual PI Meeting.
400. Letain\*, T., C. Gillaspie, M. Doublas, S. B. Clark, **T. C. Hazen**, and H. Nitsche. Invited. The Role of Biogeochemical Dynamics in the Alteration of U Solid Phases under Oxidic Conditions. March 2003, Warrenton, VA. NABIR Program Annual PI Meeting.
401. **Hazen, T. C.** Invited. Marine Pollution. March 2003, Vacaville, CA. Under Pressure Dive Club.
402. Padilla\*, E., and **T. C. Hazen**. Contributed. Molecular analysis of the Microbial Community Structure in Aerobic and Anaerobic Landfill Bioreactors. March 2003, Rio Piedras, PR. ACS Junior Technical Meeting PRISM
403. **Hazen, T. C.**, H-Y. Holman, D. Stahl, M. Fields, D. Thompson, J. Zhou, J. Wall, and M. Keller. Invited. The Virtual Institute of Microbial Stress and Survival: Rapid Deduction of Stress Response Pathways in Metal/Radionuclide Reducing Bacteria: Applied Environmental Microbiology Core. February 2003, Arlington, VA. DOE Genomes to Life Workshop.
404. Arkin\*, A., **T. C. Hazen**, J. Keasling, A. Singh, F. Olkin, I. Dubchak, H-Y. Holman, D. Stahl, M. Fields, D. Thompson, J. Zhou, J. Wall, and M. Keller. Invited. The Virtual Institute of Microbial Stress and Survival: Rapid Deduction of Stress Response Pathways in Metal/Radionuclide Reducing Bacteria: Overview. February 2003, Arlington, VA. DOE Genomes to Life Workshop.
405. Brodie\*, E. L., M. K. Firestone, J. Pena, J. Larsen, Z. Zheng, **T. C. Hazen**, T. K. Tokunaga, and J. Wan. Bioreduction of Co-Contaminating Uranium and Nitrate: Effects of Carbon Release Rate. December 2002, San Francisco, CA. American Geophysical Union Annual Meeting.
406. Borglin\*, S. E., **T. C. Hazen**, and C. M. Oldenburg. Contributed. Comparison of Leachate Quality from Aerobic and Anaerobic Municipal Solid Waste Bioreactors. December 2002, San Francisco, CA. American Geophysical Union Annual Meeting.
407. Oldenburg\*, C. M., S. E. Borglin, and **T. C. Hazen**. Contributed. Simulations of Flow, Transport, and Biodegradation in Landfills. December 2002, San Francisco, CA. American Geophysical Union Annual Meeting.
408. **Hazen, T. C.** Invited. Bioremediation: the hope and the hype. November 2002, Irvine, CA. ENTEC West '02.
409. **Hazen, T. C.**, and W. Stringfellow. Invited. Critical Parameters for MNA of Chlorinated Solvents. November 2002, Oakland, CA. DOE annual Technology Information Exchange.
410. **Hazen, T. C.** Invited. Bioremediation: using biotechnology to cleanup toxic waste sites. November 2002, Squaw Valley, CA. Genetics and the Court.

411. **Hazen, T. C.** Invited. Microbial Ecology of Diffusion Limited Environments: Scale Implications for Biogeochemistry and Bioremediation. November 2002, Atlanta, GA. Georgia Institute of Technology, School of Biology.
412. **Hazen, T. C.** Invited. Bioremediation field applications. October 2002, INTERNET. First Annual EICE On-Line Conference on Environmental Biotechnology.
413. Borglin\*, S. E., C. M. Oldenburg, and **T. C. Hazen**. Invited. Smart Storage: Stabilization of Stored and Landfilled Waste using Aerobic and Anaerobic Biotreatment Technology. October 2002, Washington, DC. SERDP Partners Symposium.
414. Borglin\*, S. E., **T. C. Hazen**, C. M. Oldenburg, and P. Zawislanski. Contributed. Biotreatment of Municipal Solid Waste in Aerobic and Anaerobic Laboratory Bioreactors. October 2002, Asheville, NC. Second International Landfill Research Symposium.
415. **Hazen, T. C.** Invited. In Situ Bioremediation: From Research to Practical Applications. October 2002, Boise, ID. 2002 Subsurface Science Symposium. Inland Northwest Research Alliance, Inc.
416. **Hazen, T. C.** Newspaper Article. New Defenders by Lisa Davis (Interview). September 11-17 2002, San Francisco, CA. SF Weekly 18-19, 22-23, 27, vol 21, no. 32.
417. **Hazen, T. C.**, T. K. Tokunaga, J. Wan, E. Schwartz, M. K. Firestone, S. R. Sutton, M. Newville, K. R. Olson, A. Lanzirrotti, and W. Rao. Contributed. Intra-aggregate biogeochemical dynamics of chromium contamination and in-situ bioremediation. September 2002, Oak Ridge, TN. NABIR FRC Workshop.
418. **Hazen, T. C.** Invited Convener. Direct characterization of microorganisms on mineral surfaces. September 2002, Copenhagen, Denmark. International Symposium on Subsurface Microbiology.
419. Letain, T., C. Gillaspie, M. Douglas, S. B. Clark, **T. C. Hazen\***, and H. Nitsche. Invited. The Role of Biogeochemical Dynamics in the Alteration of U Solid Phases under Oxic Conditions. September 2002, Copenhagen, Denmark. International Symposium on Subsurface Microbiology.
420. **Hazen, T. C.**, T. K. Tokunaga, J. Wan, E. Schwartz, M. K. Firestone, S. R. Sutton, M. Newville, K. R. Olson, A. Lanzirrotti, and W. Rao. Contributed. Intra-aggregate biogeochemical dynamics of chromium contamination and in-situ bioremediation. September 2002, Copenhagen, Denmark. International Symposium on Subsurface Microbiology.
421. **Hazen, T. C.** Invited. Ecology of Pathogens in the Environment "Why do good bugs go bad?". August 2002, Berkeley, CA. LBNL Center for Environmental Biotechnology Summer Student Seminar Series.
422. **Hazen, T. C.** Newspaper Article. Grant Money to Help Berkeley Scientists Study Environment-Cleaning Bacteria by Tyler Hillman (Interview). July 26 2002, Berkeley, CA. The Daily Californian.
423. **Hazen, T. C.** Newspaper Article. Summer Internships Benefit Students and Researchers Alike by Pam Reynolds (Interview). July 26 2002, Berkeley, CA. Berkeley Lab Currents.
424. **Hazen, T. C.** Newspaper Article. Lab Scores Big in DOE Genomes to Life Awards by Lynn Yarris (Interview). July 26 2002, Berkeley, CA. Berkeley Lab Currents.
425. **Hazen, T. C.** Newspaper Article. Bay Area scientists get big funding for microbe research by Ian Hoffman (Interview). July 24 2002, Oakland, CA. The Oakland Tribune.
426. **Hazen, T. C.** Invited. Bioremediation: the hope and the hype. July 2002, Berkeley, CA. LBNL Center for Biotechnology Summer Student Seminar Series.
427. Arkin, A., and **T. C. Hazen**. Invited. Genomes to Life Proposal on Virtual Institute for Microbial Stress and Survival. June 2002, Berkeley, CA. LBNL DOE Office of Science On-Site Review.
428. **Hazen, T. C.**, T. K. Tokunaga, J. Wan, E. Schwartz, M. K. Firestone, S. R. Sutton, M. Newville, K. R. Olson, A. Lanzirrotti, and W. Rao. Contributed. Intra-aggregate biogeochemical dynamics of chromium contamination and in-situ bioremediation. June 2002, Monterey, CA. Bioremediation and Biodegradation: Current Advances in Reducing Toxicity, Exposure and Environmental Consequences. EPA/NIH Superfund Basic Research Program.
429. **Hazen, T. C.**, and T. Torok. Invited. "What do we do first?!!!" Detecting Biothreat Agents, The Latest Protocols and Procedures. June 2002, Berkeley, CA. Berkeley Fire Department.
430. **Hazen, T. C.**, R. Knopp, T. Letain\*, H. Nitsche, R. Silva, and W. Stringfellow. Contributed. Defining the Interactions Between Microbial Cell Surfaces and Uranium (VI) In Aerobic Conditions. May 2002, Washington, DC. Annual Meeting of the American Society for Microbiology.
431. **Hazen, T. C.** Invited. Bioremediation of a Polish Oil Refinery sludge Lagoon. May 2002, Berkeley, CA. Glen T. Seaborg Center Seminar. Chemical Sciences Division, LBNL.
432. **Hazen, T. C.**, and E. Majer. Invited. Communicating with Program Managers. May 2002, Berkeley, CA. Earth Sciences Division Workshop, LBNL.
433. **Hazen, T. C.**, and T. Torok. Invited. "What do we do first?!!!" Detecting Biothreat Agents, The Latest Protocols and Procedures. May 2002, Napa, CA. California Conference of Local Health Officers, Health Officers Association of California, California Department of Health Services.

434. **Hazen, T. C.** Invited. Ecology of Pathogens in the Environment “Why do good bugs go bad?”. April 2002, Davis, CA. University of California at Davis, Annual Open House, Division of Biological Sciences.
435. **Hazen, T. C.** Invited. Ecology of Pathogens in the Environment “Why do good bugs go bad?”. April 2002, Washington, DC. LBNL DC Office Seminar Series.
436. Letain, T., C. Gillaspie, M. Douglas, S. B. Clark, **T. C. Hazen**, and H. Nitsche. Invited. The Role of Biogeochemical Dynamics in the Alteration of U Solid Phases under Oxidic Conditions. March 2002, Warrenton, VA. NABIR Program Annual PI Meeting.
437. Wan, J., T. K. Tokunaga, **T. C. Hazen**, M. K. Firestone, E. Schwartz, K. R. Olson, S. R. Sutton, M. Newville, A. Lanzirotti, and W. Rao. Invited. Bridging the Batch-Field Gap: Chromium Biogeochemistry in Diffusion-Limited Domains. March 2002, Warrenton, VA. NABIR Program Annual PI Meeting.
438. **Hazen, T. C.**, R. Charbonneau, and B. B. Looney. Invited. Benzene and Toluene contamination from new wells at Pantex. April 2002, Amarillo, TX. Newspapers and Television in Amarillo and Public Meeting.
439. Arkin, A., and **T. C. Hazen**. Invited. LBNL Genomes to Life Proposal. March 2002, Germantown, MD. DOE Office of Biological and Environmental Research Program Managers.
440. Oldenburg\*, C. M., S. E. Borglin, **T. C. Hazen**, P. T. Zawislanski. Invited. Process Modeling of Flow, Transport, and Biodegradation in Landfill Bioreactors. February 2002, Berkeley, CA. Earth Sciences Division, LBNL Directors Review.
441. Faybishenko\*, B., and **T. C. Hazen**. Contributed. Fuzzy systems modeling of in situ bioremediation of chlorinated solvents. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
442. Letain\*, T. E., R. J. Silva, H. Nitsche, **T. C. Hazen**, S. B. Clark, M. Douglas, C. Billaspie, R. Knopp, and P. J. Panak. Contributed. The role of biogeochemical dynamics in the alteration of Uranium solid phases under oxidic conditions. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
443. Oldenburg\*, C. M., S. E. Borglin, **T. C. Hazen**, P. T. Zawislanski. Contributed. Process Modeling of Flow, Transport, and Biodegradation in Landfill Bioreactors. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
444. Greenberg\*, M. R., **T. C. Hazen**, S. E. Borglin, and C. M. Oldenburg. Contributed. Factors controlling metals concentration in aerobic and anaerobic laboratory landfill bioreactors. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
445. **Hazen, T. C.** Invited. In situ respiration and direct enzymatic assays for assessing bioremediation. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
446. Borglin\*, S.E., **T. C. Hazen**, C. M. Oldenburg, and P. T. Zawislanski. Contributed. Mesoscale Laboratory Models of the Aerobic Biodegradation of Municipal Landfill Materials. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
447. Tokunaga\*, T. K., J. Wan, **T. C. Hazen**, M. K. Firestone, E. Schwartz, K. R. Olson, S. R. Sutton, M. Newville, A. Lanzirotti, and W. Rao. Contributed. Intra-aggregate biogeochemical dynamics of chromium contamination and in-situ remediation. December 2001, San Francisco, CA. American Geophysical Union Annual Meeting.
448. **Hazen, T. C.** Invited. Deep Subsurface Microbiology and the Homestake Gold Mine. December 2001, Lead, SD. National Underground Science Laboratory Microbiology Conference.
449. **Hazen, T. C.**, and T. Torok. Invited. The Ecology of *Bacillus anthracis*. November 2001, Berkeley, CA. University of California EH&S Directors Meeting.
450. **Hazen, T. C.**, and T. Torok. Invited. The Ecology of *Bacillus anthracis*. November 2001, Berkeley, CA. Lawrence Berkeley National Laboratory.
451. **Hazen, T. C.** Invited. The Ecology of Pathogens in the Environment. November 2001, Berkeley, CA. Lawrence Berkeley National Laboratory.
452. **Hazen, T. C.** Invited. In situ Bioremediation of Solvent Contaminated Sites using Gaseous Nutrient Injection. November 2001, Oakland, CA. California Regional Water Quality Board.
453. **Hazen, T. C.**, and T. Torok. Invited. The Ecology of *Bacillus anthracis*. November 2001, Berkeley, CA. Lawrence Berkeley National Laboratory Safety Update.
454. **Hazen, T. C.** Invited. In Situ Bioremediation: Lab to Field. October 2001, Sacramento, CA. 23rd Biennial Groundwater Conference and 10th Annual Groundwater Resources Association Meeting.
455. **Hazen, T. C.** Invited. DOE EM Restoration Needs and Direction. October 2001, Washington, DC. DOE NABIR Biological and Environmental Research Advisory Committee Review.
456. **Hazen, T. C.** Invited. Deep Subsurface Microbiology and the Homestake Gold Mine. October 2001, Lead, SD. National Underground Science Laboratory Conference.
457. **Hazen, T. C.** Invited. Aerated landfills, changing the “dry tomb” paradigm. September 2001, Belgrade, Yugoslavia. First International Conference on Environmental Recovery of Yugoslavia.

458. **Hazen, T. C.**, A. J. Tien, A. Worsztynowicz, D. J. Altman, K. Ulfig, G. Plaza, and T. Manko. Invited. Poland petroleum refinery sludge lagoon cleanup using a biopile. September 2001, Belgrade, Yugoslavia. First International Conference on Environmental Recovery of Yugoslavia.
459. **Hazen, T. C.** Invited. Bioremediation: the hope and the hype. September 2001, Belgrade, Yugoslavia. First International Conference on Environmental Recovery of Yugoslavia.
460. Tokunaga\*, T., J. Wan, **T. C. Hazen**, K. Olson, M. Firestone, E. Schwartz, S. Sutton, M. Newville, and A. Lanzirotti. Contributed Paper. Diffusion-limited chromium reduction in soil aggregates. August 2001, Chicago, IL. ACS National Meeting.
461. Schwartz\*, E., T. Tokunaga, J. Wan, T. Hazen, and M. Firestone. Contributed. Microbial Communities and Hexavalent Chromium Transport in Soil. August 2001, Amsterdam, Netherlands. 9th International Symposium on Microbial Ecology.
462. **Hazen, T. C.** Invited Workshop. Tropical Water Quality: Survival of Pathogens and their Indicators. Water Quality Issues Workshop. July 2001, Berkeley, CA. LBNL Special Workshop.
463. Ulfig, K., G. Plaza\*, A. J. Tien, A. Worsztynowicz, M. A. Heitkamp, and **T. C. Hazen**. Contributed. Microbial Aspects of Bioremediation. June 2001, Orlando, FL. 2001 International Containment & Remediation Technology Conference and Exhibition.
464. DeAngelis\*, K., E. Schwartz, M. Firestone, J. Wan, T. Tokunaga, D. Joyner, and **T. C. Hazen**. Microbial community composition and chromium transport in a clay sediment. June 2001, Berkeley, CA. UC Berkeley, 2nd Ann. Microbiology Symposium.
465. **Hazen, T. C.** Contributed. Aerated Landfills, Changing the Subtitle D "Dry Tomb" Paradigm. June 2001, Orlando, FL. 2001 International Containment & Remediation Technology Conference and Exhibition.
466. **Hazen, T. C.** Invited. Bioremediation: The Hope and the Hype. June 2001, Orlando, FL. 2001 International Containment & Remediation Technology Conference and Exhibition.
467. Faybishenko\*, B., and **T. C. Hazen**. Contributed. Fuzzy Systems Modeling of In Situ Bioremediation of Chlorinated Solvents. June 2001, Orlando, FL. 2001 International Containment & Remediation Technology Conference and Exhibition.
468. Chauhan\*, S., L. Méndez, J. Montalvo, and **T. C. Hazen**. Contributed. Gaseous In situ bioremediation of benzo(a)pyrene in soil. June 2001, San Diego, CA. In Situ and On Site Bioremediation: The Sixth International Symposium.
469. Borglin\*, S., **T. C. Hazen**, C. Oldenburg, and P. Zawislanski. Contributed. Laboratory Investigation of the Biodegradation of Municipal Landfill Materials. June 2001, San Diego, CA. In Situ and On Site Bioremediation: The Sixth International Symposium.
470. **Hazen, T. C.**, A. J. Tien, A. Worsztynowicz, D. J. Altman, K. Ulfig, G. Plaza, and T. Manko. Contributed. Poland Petroleum Refinery Sludge Lagoon biopile Demonstration Project. June 2001, San Diego, CA. In Situ and On Site Bioremediation: The Sixth International Symposium.
471. **Hazen, T. C.** Invited Seminar. Aerobic Bioremediation of Landfills: Changing the 'Dry Tomb' Paradigm. May 2001, Ocean Springs, MS. Gulf Coast Research Laboratory, University of Southern Mississippi.
472. **Hazen, T. C.** Invited Seminar. In situ Bioremediation of Solvent Contaminated Sites using Gaseous Nutrient Injection. April 2001, Seattle, WA. Department of Civil and Environmental Engineering, University of Washington.
473. **Hazen, T. C.** Invited Seminar. Technical Baseline Reassessments. April 2001, Oakland, CA. Oakland Site Technology Coordination Group.
474. Tokunaga\*, T., J. Wan, **T. C. Hazen**, K. Olson, M. Firestone, E. Schwartz, S. Sutton, M. Newville, and A. Lanzirotti. Contributed Paper. Mesoscale Biotransformation Dynamics Controlling Reactive Transport of Chromium. March 2001, Reston, VA. NABIR Annual Investigators Meeting.
475. Nitsche, H., S. B. Clark\*, and **T. C. Hazen**. Contributed Paper. The role of biogeochemical dynamics in the alteration of U solid phases under oxic conditions. March 2001, Reston, VA. NABIR Annual Investigators Meeting.
476. **Hazen, T. C.** Invited Workshop. The survival of indicators and pathogens in tropical waters. March 2001, Honolulu, HI. EPA workshop on Tropical Indicators.
477. **Hazen, T. C.** Invited Seminar. Aerobic Bioremediation of Landfills: Changing the 'Dry Tomb' Paradigm. March 2001, Honolulu, HI. University of Hawaii, Water Resources Center.
478. **Hazen, T. C.** Invited Seminar. In situ bioremediation of solvents and organic contaminants using gaseous nutrient injection. January 2001, Livermore, CA. Lawrence Livermore National Laboratory.
479. **Hazen, T. C.** Invited Seminar. Landfill Aerobic Bioremediation/ Gaseous Nutrient Injection for In Situ Bioremediation of Fuels and Chlorinated Solvents. December 2000, San Francisco, CA. Land Transfer and Long Term Management of Contaminated Federal Facilities.

480. **Hazen, T. C.** Invited Seminar. Poland Petroleum Refinery Sludge Lagoon biopile Demonstration Project. December 2000, San Francisco, CA. Land Transfer and Long Term Management of Contaminated Federal Facilities.
481. **Hazen, T. C.** Invited Seminar. Bioremediation: the hope and the hype. December 2000, Livermore, CA. Lawrence Livermore National Laboratory.
482. **Hazen, T. C.** Invited Seminar. Aerobic Bioremediation of Landfills: Changing the 'Dry Tomb' Paradigm. December 2000, Boston, MA. Department of Civil and Environmental Engineering, Massachusetts Institute of Technology.
483. **Hazen, T. C.** Invited Seminar. Bioremediation: the hope and the hype. November 2000, Augusta, GA. 6th Annual DOE Technology Information Exchange.
484. Montañez, J., L. Méndez, S. Chauhan, and **T. C. Hazen**. Contributed. Polynuclear aromatic hydrocarbons in situ bioremediation treatability test; focus on contaminant disappearance by HPLC analysis. November 2000, Los Angeles, CA. Annual meeting American Institute of Chemical Engineers.
485. **Hazen, T. C.** Invited Seminar. Aerobic Bioremediation of Landfills: Changing the 'Dry Tomb' Paradigm. October 2000, Davis, CA. Environmental and Water Resources Engineering Series, University of California at Davis.
486. **Hazen, T. C.** Contributed. Full-scale Biopile Remediation of PAH's at a Polish Oil Refinery Sludge Lagoon. November 2000, Albuquerque, NM. International Petroleum Conference.
487. **Hazen, T. C.** Invited Seminar. Aerobic Landfills: Changing the Subtitle D 'Dry Tomb' Paradigm. October 2000, Albuquerque, NM. New Mexico Environmental Health Conference.
488. **Hazen, T. C.** Invited Seminar. Ecology of Caribbean Coral Reefs. October 2000, Vacaville, CA. Vacaville SCUBA Club.
489. **Hazen, T. C.** Invited Seminar. In situ Bioremediation of Solvent Contaminated Sites using Gaseous Nutrient Injection. October 2000, Los Angeles, CA. Department of Biology, Chico State University.
490. **Hazen, T. C.** Invited Seminar. Bioremediation: the hope and the hype. September 2000, Lake Arrowhead, CA. 8th International Conference on Small Genomes.
491. **Hazen, T. C.** Invited Key Speaker. Bioremediation and GMO. September 2000, Chapel Hill, NC. The Southeast Regional Judicial Conference on Genetics in the Courtroom. NC Supreme Court Workshop.
492. Worsztynowicz, A., D. Rzychon, M. Adamski, K. Zacharz, S. Iwaszenko, K. Ulfig, G. Plaza, T. Manko, J. Krajewska, K. Lukasik, A. Tien, D. Altman, T. Hazen, B. Jagosz, J. Mos. Invited Presentation. Bioremediation of Soil Contaminated with Petroleum Wastes using a Biopile Technique – A Case Study. September 2000, Prague, Czech Republic. Prague 2000, Fifth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, Environmental Issues in Central and Eastern Europe.
493. **Hazen, T. C.** Invited Presentation. Aerobic Landfill Bioreactors. September 2000, Prague, Czech Republic. Prague 2000, Fifth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, Environmental Issues in Central and Eastern Europe.
494. Ulfig, K., G. Plaza, A. Tien, D. Altman, and **T. C. Hazen**. Invited Seminar. Microbial Overview of Biopile Demonstration. September 2000, Prague, Czech Republic. Prague 2000, Fifth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, Environmental Issues in Central and Eastern Europe.
495. **Hazen, T. C.** Invited Seminar. Bioremediation: State of the Science. September 2000, Prague, Czech Republic. Prague 2000, Fifth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, Environmental Issues in Central and Eastern Europe.
496. **Hazen, T. C.** Invited Workshop. Bioremediation research collaborative research for the EPSCOR Program. August 2000, Berkeley, CA. DOE EPSCOR annual workshop.
497. **Hazen, T. C.** Invited Workshop. Bioremediation research sponsored by DOE. August 2000, Berkeley, CA. DOE EPSCOR annual workshop.
498. **Hazen, T. C.** Invited Seminar. Aerated Landfills. July 2000, San Diego, CA. Annual Meeting of the Society for Industrial Microbiology.
499. **Hazen, T. C.** Invited Seminar. Intimate Strangers: Creators of the Future – Q&A. July 2000, Berkeley, CA. LBNL Summer Student Program.
500. **Hazen, T. C.** Invited Workshop. Bioremediation Studies of UXO. June 2000, Berkeley, CA. BEST Program Workshop on Bioremediation.
501. **Hazen, T. C.** Invited Key Speaker. Application of Biopiles. June 2000, Prague, Czech Republic. NATO Advanced Research Workshop "The Utilization of Bioremediation to Reduce Soil Contamination: Problems and Solutions"
502. **Hazen, T. C.** Invited Seminar. Bioremediation and DNAPLs. May 2000, Monterey, CA. International Conference on Chlorinated and Recalcitrant Compound Remediation.
503. Tien, A. J., A. Worsztynowicz, D. J. Altman, **T. C. Hazen**, K. Ulfig, G. Plaza, and T. Manko. Contributed. Poland Petroleum Refinery Sludge Lagoon Biopile Demonstration Project. May 2000, Los Angeles, CA. American Society for Microbiology Annual Meeting.

504. Clark, M. B, **T. C. Hazen**, R. A. Rodriguez-Martinez, and T. Torok. Contributed. Microbial community studies of differently treated explosive contaminated soils. May 2000, Los Angeles, CA. American Society for Microbiology Annual Meeting.
505. **Hazen, T. C.** Invited Symposium. Bioremediation at LBNL. May 2000, Berkeley, CA. LBNL Open House.
506. Rivera, C., and **T. C. Hazen**. Contributed. Chemotaxis of *Pseudomonas fluorescens* to 2,4 and 2,6-dinitrotoluene. March 2000, San Francisco, CA. American Chemical Society Spring Meeting.
507. **Hazen, T. C.** Invited Seminar. Bioremediation using GMO. March 2000, Berkeley, CA. UC Berkeley and Biotechnology: Developing Strategic Partnerships, School of Public Health, University of California at Berkeley.
508. **Hazen, T. C.** Invited Seminar. Full-scale Biopile Remediation of PAH's at a Polish Oil Refinery Sludge Lagoon. February 2000, Berkeley, CA. Department of Civil and Environmental Engineering, University of California at Berkeley.
509. Palumbo, A., S. Pfiffner, **T. C. Hazen**, and T. Phelps. Invited Workshop. Scaling Lab to the Field. February 2000, Reston, VA. NABIR annual investigators meeting.
510. **Hazen, T. C.** Invited Workshop. Scaling Lab to the Field. February 2000, Reston, VA. NABIR annual investigators meeting.
511. Wan, J., T. Tokunaga, D. Joyner, **T. C. Hazen**, M. Firestone, E. Schwartz, S. Sutton, and M. Newville. Invited Symposium. Mesoscale biotransformation dynamics controlling reactive transport of chromium. February 2000, Reston, VA. NABIR annual investigators meeting.
512. **Hazen, T. C.** Invited Seminar. Full-scale Biopile Remediation of PAH's at an Oil Refinery Sludge Lagoon. January 2000, El Paso, TX. University of Texas at El Paso.
513. **Hazen, T. C.** Invited Workshop. Phytoremediation research at LBNL and DOE. November 1999, Jackson, MS. BEST Program Phytoremediation Workshop sponsored by Jackson State University.
514. **Hazen, T. C.** Invited Seminar. Full-scale Biopile Remediation of PAH's in an Oil Refinery Sludge Lagoon. November 1999, Jackson, MS. Jackson State University.
515. **Hazen, T. C.**, A. J. Tien, A. Worsztynowicz, K. Ulfig, and D. J. Altman. Invited Seminar. Bioremediation Field Demonstration of a Sludge Lagoon at a Polish Petroleum Refinery. November 1999, San Francisco, CA. Fourth USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology.
516. **Hazen, T. C.** Invited Seminar. Critical Biogeochemical Parameters for Bioremediation of Solvents in Fractured Rock. November 1999, San Francisco, CA. Fourth USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology.
517. **Hazen, T. C.** Invited Workshop. Chemical/Biological Subsurface Barriers. October 1999, Reston, VA. NABIR Workshop on Chemical/Biological Treatment.
518. **Hazen, T. C.** Invited Seminar. Computer assisted presentations. October 1999, Berkeley, CA. LBNL Macintosh Users Group.
519. **Hazen, T. C.** Invited Seminar. Field studies of aerobic bioremediation of groundwater contaminated by a Sanitary Landfill. August 1999, Vail, CO. International Symposium on Deep Subsurface Microbiology.
520. **Hazen, T. C.** Invited Seminar. Critical Biogeochemical Parameters for Bioremediation of Solvents in Fractured Rock. August 1999, Vail, CO. International Symposium on Deep Subsurface Microbiology.
521. **Hazen, T. C.** Newspaper Article. Lab Researchers Star on PBS by Paul Preuss (Interview). July 30 1999, Berkeley, CA. Berkeley Lab Currents.
522. **Hazen, T. C.** Invited Presentation. Methane injection pilot study for bioremediation of Old Town solvent Plume. July 1999, Berkeley, CA. California Regional Water Quality Board.
523. **Hazen, T. C.** Invited Seminar. Recent Innovations in Bioremediation. June 1999, Charleston, SC. ER-TEC'99 Environmental Restoration Technology End User Conference sponsored by DOE/DOD/EPA.
524. **Hazen, T. C.**, J. Radway, J. Kastner, and M. Franck. Invited Seminar. Biosparging for rapid in situ cleanup of solvent contaminated soil and groundwater at the SRS D-area Oil Seepage Basin. June 1999, Charleston, SC. ER-TEC'99 Environmental Restoration Technology End User Conference sponsored by DOE/DOD/EPA.
525. **Hazen, T. C.** Invited Seminar. Bioremediation of Contaminated Subsurface Environments. May 1999, Chicago, IL. American Society for Microbiology Annual Meeting.
526. **Hazen, T. C.** Invited Seminar. U.S. Landfills: Changing the Subtitle D Paradigm, "Dry Tombs" to Bioreactors. April 1999, Berkeley, CA. Department of Environmental Engineering, University of California, Berkeley.
527. Drinkwine, A. D., and **T. C. Hazen**. Contributed. Remediation of TCE Contaminated Ground Water Using Methane Injection to Enhance Cometabolism Demonstration Project at the Hastings Former Naval Ammunition Depot. April 1999, San Diego, CA. In Situ and On Site Bioremediation Symposium
528. Brigmon, R. L., D. J. Altman, M. M. Franck, **T. C. Hazen**, and C. B. Fliermans. Contributed. Evaluation of Methanotrophic Bacteria during Injection of Gaseous Nutrients for In situ Trichloroethylene Bioremediation in a Sanitary Landfill. April 1999, San Diego, CA. In Situ and On Site Bioremediation Symposium

529. Drinkwine, A. D., and **T. C. Hazen**. Invited Seminar. Remediation of TCE Contaminated Ground Water Using Methane Injection to Enhance Cometabolism Demonstration Project at the Hastings Former Naval Ammunition Depot. April 1999 "Gateway to the New Millennium" Conference.
530. **Hazen, T. C.** Invited Seminar. U.S. Landfills: Changing the Subtitle D Paradigm, "Dry Tombs" to Bioreactors. March 1999, Berkeley, CA. Earth Sciences Division Colloquia, Lawrence Berkeley National Laboratory.
531. **Hazen, T. C.** Invited Seminar. Innovative Bioremediation Demonstrations of Petroleum Contaminated Sites in Poland and US. March 1999, Berkeley, CA. Petroleum Environmental Research Forum hosted by Chevron.
532. **Hazen, T. C.** Invited Seminar. U.S. Landfills: Changing the Subtitle D Paradigm, "Dry Tombs" to Bioreactors. March 1999, Rio Piedras, PR. University of Puerto Rico.
533. **Hazen, T. C.** Invited Seminar. Bioremediation – State of the Science. March 1999, San Juan, PR. Universidad Metropolitana.
534. **Hazen, T. C.** Invited Seminar. U.S. Landfills: Changing the Subtitle D Paradigm, "Dry Tombs" to Bioreactors. February 1999, Winston-Salem, NC. Biology Department 1999 Distinguished Alumni Lecture. Wake Forest University.
535. **Hazen, T. C.** Invited Symposium. Critical Biogeochemical Parameters Used for In Situ Bioremediation of Solvents in Fractured Rock. February 1999, Berkeley, CA. Witherspoon Symposium: Dynamics of Fluids in Fractured Rocks.
536. Wan, J., T. Tokunaga, **T. C. Hazen**, and M. Firestone. Invited Symposium. Mesoscale Biotransformation Dynamics as the Basis for Predicting Core Scale Reactive Transport of Chromium and Uranium. January 1999, Reston, VA. Annual DOE NABIR Investigators Meeting.
537. **Hazen, T. C.** Invited Seminar. The NABIR FRC Web Page. January 1999, Reston, VA. Annual DOE NABIR Investigators Meeting.
538. Tien, A. J., A. Worsztynowicz, K. Zacharz, D. J. Altman, and **T. C. Hazen**. Invited Seminar. Technology Development and Transfer for Environmental Remediation: Joint American and Polish Cooperation. January 1999, Seattle, WA. Sigma Xi annual meeting.
539. **Hazen, T. C.** Invited Seminar. U.S. Landfills: Changing the Subtitle D Paradigm. October 1998, Stanford, CA. Stanford University, School of Engineering Seminar Series.
540. **Hazen, T. C.** Invited Seminar. Methane biostimulation for cleanup of chlorinated solvents at the Naval Ammunition Depot. October 1998, Hastings, NE. Award presentation by the Nebraska Department of Environmental Quality to the Army Corps of Engineers.
541. **Hazen, T. C.** Invited Workshop. Bioremediation of chlorinated solvents. October 1998, Hastings, NE. Workshop sponsored by the Army Corps of Engineers and the Nebraska Department of Environmental Quality.
542. Worsztynowicz, A., A. Tien, K. Ulfig, K. Zacharz, M. Adamski, and D. Rzychon, and **T. C. Hazen**. Invited Symposium. Soil Cleaning at the Czechowice Refinery. September 1998, Warsaw, Poland. Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98).
543. Ulfig, K., A. Tien, G. Plaza, A. Worsztynowicz, and **T. C. Hazen**. Invited Symposium. Microbiological changes in petroleum-contaminated soil during bioremediation at a Polish petroleum refinery. September 1998, Warsaw, Poland. Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98).
544. **Hazen, T. C.** Invited Symposium. Bioremediation Overview, U.S. Department of Energy-Supported Research and Development in Central and Eastern Europe and Russia. September 1998, Warsaw, Poland. Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98).
545. **Hazen, T. C.** Invited Workshop. Bioremediation: State-of-the-Science, Special Workshop on DOE projects in Poland. September 1998, Warsaw, Poland. Fourth International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe (Warsaw'98).
546. Legrand, R., A. J. Morecraft, J. A. Harju, T. D. Hayes, and **T. C. Hazen**. Contributed. Field Application of in situ methanotrophic treatment for TCE remediation. May 1998, Monterey, CA.
547. Tien, A. J., A. Worsztynowicz, K. Ulfig, D. Altman, and **T. C. Hazen**. Contributed. Comparison of Aeration and Nutrient Amendment Strategies during Bioremediation of Petroleum Sludge Contaminated Soils from A Polish Refinery- Batch and Soil Column Studies. May 1998, Atlanta, GA. American Society for Microbiology Annual Meeting.
548. **Hazen, T. C.** and B. B. Looney. Invited Workshop. Bioremediation using SRS Patented Technologies. May 1998, Aiken, SC. Southeastern Environmental Resource Alliance sponsored workshop for remediation industry.
549. Peters, N. E., M. Bonell, T. Hazen, S. Foster, M. Meybeck, W. Rast, G. Schneider, V. Tsirkunov, and J. Williams. Invited Symposium. Water Quality Degradation and Freshwater Availability — Need for A Global Initiative. UNESCO colloquium, entitled "Water - A Looming Crisis" April 1998, Paris, France.
550. **Hazen, T. C.** Invited Symposium. "How do I know if in situ bioremediation is feasible?" March 1998, Notre Dame, IN. Bioremediation for Industry, Society for Industrial Microbiology.

551. **Hazen, T. C.** Invited Symposium Co-Chair. In Situ Bioremediation: Natural vs. Accelerated. March 1998, Notre Dame, IN. Bioremediation for Industry, Society for Industrial Microbiology.
552. **Hazen, T. C.** Invited Seminar. Field Bioremediation at SRS. January 1998, Arlington, VA. DOE Natural and Accelerated Bioremediation Research Program Investigators meeting.
553. **Hazen, T. C.** Invited Seminar. Microbiological aspects of wastewater treatment for small communities and small sources. December 1997, Chirvanny, Slovak Republic. Sponsored by Heinz Endowment.
554. **Hazen, T. C.** and B. B. Looney. Invited Workshop. Bioremediation using SRS Patented Technologies. December 1997, Aiken, SC. Southeastern Environmental Resource Alliance sponsored workshop for remediation industry.
555. **Hazen, T. C.** Invited Seminar. Field Bioremediation strategies. November 1997, Germantown, MD. DOE Natural and Accelerated Bioremediation Research Program.
556. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation of chlorinated solvents. November 1997, Arlington, VA. George Mason University.
557. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation. November 1997, Orlando, FL. 3rd Annual Florida Remediation Conference.
558. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation strategies for landfills. October 1997, Athens, GA. Department of Microbiology, University of Georgia.
559. **Hazen, T. C.** Newspaper Article. Students get a 'real' education by Bill Bengtson Interviews and pictures of students. October 24 1997, Aiken, SC. Aiken Standard Pages 1B,3B.
560. **Hazen, T. C.** Newspaper Article. Student practice real science by Chasiti Kirkland Interviews and pictures of students. October 24 1997, Augusta, GA. Augusta Chronicle Pages 2B,6B
561. **Hazen, T. C.** Invited Seminar/Tour. SRS Biotechnology School-to-Work Program. October 1997, Aiken, SC. Aiken County Schools Superintendent, Board and Principals.
562. **Hazen, T. C.** Invited Conference. SRS Biosensor Research. October 1997, Washington, DC. DOE Biotechnology Interlaboratory Council meeting with Army JPO BioDefense.
563. **Hazen, T. C.** Invited Workshop. In Situ Aerobic Co Metabolic Bioremediation of Chlorinated Solvents: Field Demonstrations. September 1997, Baltimore, MD. US Air Force Expert Panel on In Situ Aerobic Co Metabolic Bioremediation of Chlorinated Solvents.
564. **Hazen, T. C.** Invited Seminar. Full-Scale field remediation Demonstrations: Lessons Learned. September 1997, Berkeley, CA. Lawrence Berkeley National Laboratory.
565. **Hazen, T. C.** Invited Workshop. Bioremediation. September 1997, Katowice, Poland. Risk Abatement Center of Central and Eastern Europe.
566. **Hazen, T. C.** Newspaper Article. Giving germs what they want - garbage as food by Jim Fasnacht. August 1997, Aiken, SC. SRS News.
567. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation in situ. August 1997, Reno, NV. Bioremediation Symposium Society for Industrial Microbiology.
568. **Hazen, T. C.** Newspaper Article. SRS scientist studies bad water (with picture) by Karin Schill. Monday July 21 1997, Augusta, GA. Augusta Chronicle 2B & 5B.
569. **Hazen, T. C.** Invited Moderator. July 1997, Boston, MA. Roundtable: Passive vs. Accelerated Remediation. Second Annual Novel Remediation Technology Symposium: Innovative Remedial Technologies for Cost Effective Site Solution.
570. **Hazen, T. C.** Invited Seminar. July 1997, Boston, MA. In Situ Bioremediation using nutrient injection. Second Annual Novel Remediation Technology Symposium: Innovative Remedial Technologies for Cost Effective Site Solution.
571. **Hazen, T. C.** Newspaper Article. SRTC microbiologist named to United Nations panel (with picture) by Angeline Fitzgerald. July 1997, Aiken, SC. SRS News p4.
572. **Hazen, T. C.** Invited Seminar. July 1997, Berlin, Germany. In Situ Bioremediation of Chlorinated Solvents. WISTA and BIOPRACT Inc.
573. **Hazen, T. C.** Invited Seminar. July 1997, Paris, France. Microbiological issues for Global Water Quality. United Nations Task Force on Global Water Quality.
574. **Hazen, T. C.** Newsletter Article. People in Energy: Terry Hazen. July 1997, Washington, DC. DOE this Month 20:18.
575. **Hazen, T. C.** Invited Panelist. June 1997, Aiken, SC. Groundwater Issues and Water Quality. Science Education for Public Understanding Workshop for middle and high school teachers in the Central Savannah River Area.
576. **Hazen, T. C.** Newspaper Article. Hazen picked by United Nations (with picture) by R. Burris. June 12 1997, Aiken, SC. Aiken Standard
577. **Hazen, T. C.** Invited Seminar. May 1997, Aiken, SC. Bioremediation. University of South Carolina, School of the Environment.

578. **Hazen, T. C.** Trade Journal. PHOSter's Phosphorus-Charged Bacteria Speeds Cleanups. May 1997, Washington, DC. Underground Storage Tank Guide 9:4-5.
579. Young, J. D., D. J. Altman, K. H. Lombard, A. W. Bourquin, D. C. Mosteller, and **T. C. Hazen.** Contributed. Sanitary landfill optimization test for remediation of chlorinated solvents. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
580. Ulfig, K., G. Plaza, **T. C. Hazen,** C. B. Fliermans, M. M. Franck, and K. H. Lombard. Contributed. Bioremediation treatability and feasibility studies at a polish petroleum refinery. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
581. Kastner, J. R., K. H. Lombard, J. Radway, **T. C. Hazen,** G. Burbage, D. J. Altman, M. M. Franck, F. A. Washburn, C. J. Berry, and R. L. Brigmon. Contributed. Bioventing vs. prepared beds for remediation of petroleum contaminated sites. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
582. Lombard, K. H., A. Worsztynowicz, **T. C. Hazen,** and B. Jagosz. Contributed. Bioremediation techniques for the clean up of a petroleum waste lagoon. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
583. Santo Domingo, J. W., B. E. Bumgarner, D. J. Altman, C. J. Berry, and **T. C. Hazen.** Contributed. Physiological response of subsurface microbial communities to nutrient additions. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
584. Radway, J. C., J. W. Santo Domingo, C. J. Berry, E. W. Wilde, and **T. C. Hazen.** Contributed. Degradation of trichloroethylene and benzene by embedded Burkholderia cepacia G4. April 1997, New Orleans, LA. In Situ and On-Site Bioreclamation, The Fourth International Symposium.
585. **Hazen, T. C.** Invited Seminar. Bioremediation Technologies. March 1997, Columbia, SC. University of South Carolina, School of the Environment.
586. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation of chlorinated solvents: field demonstrations and studies. March 1997, Las Vegas, NV. U. S. Army Corps of Engineers Seventh Annual Combined Innovative Technology and Chemistry Workshop.
587. **Hazen, T. C.** Invited Seminar. Dry Tomb vs. Bioremediation: are current regulations increasing our long-term liability. March 1997, Aiken, SC. SRS Groundwater Update Meeting.
588. **Hazen, T. C.** Invited Seminar. Environmental Biotechnology Section Expertise. March 1997, Aiken, SC. Bechtel Environmental Restoration Division.
589. **Hazen, T. C.** Invited Seminar & Review. Methane Biostimulation for Chlorinated Solvent Cleanup. February 1997, Chicago, IL. Gas Research Institute, Transco, and Radian International.
590. **Hazen, T. C.** Invited Seminar & Tour. Bioremediation Demonstrations at the SRS. February 1997, Aiken, SC. Army Corps of Engineers & Woodward & Clyde.
591. **Hazen, T. C.** Invited Dinner Seminar. Landfill Bioremediation or Why the 'Dry Tomb' approach should be Doomed. January 1997, Augusta, GA. CSRA chapter of AIChE.
592. **Hazen, T. C.** Science Magazine Article. Slimmed down diet is best for soil-cleaning bacteria. January 11 1997, London, UK. New Scientist xxx:16.
593. **Hazen, T. C.** Engineering Magazine Article. PHOSter Care. November/December 1996, New York, NY. Emerging Technology 3(6):1, 8-9 ASCE Publication.
594. **Hazen, T. C.** Magazine Article. Phosphate-Accelerated Bioremediation. Fall 1996, Washington, DC. TIE Quarterly 5(2):6 USDOE Office of Environmental Restoration.
595. **Hazen, T. C.** Trade Magazine Article. Mom & Pop Clean up. December 1996, New York, NY. Initiatives in Environmental Technology Investment 3:4-5 Publication of Urban Energy & Transportation Corporation
596. **Hazen, T. C.** Invited Chairperson. Natural Attenuation. December 1996, Annapolis, MD. IBC's Second Annual International Symposium on Intrinsic Bioremediation.
597. **Hazen, T. C.,** K. H. Lombard, and E. W. Wilde. Invited Seminar and Tour. Bioremediation Demonstrations by the Biotechnology Group at SRS. October 1996, Aiken, SC. Japanese Business and Technology Reps (12).
598. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation of chlorinated solvents: field demonstrations and studies. October 1996, Lincoln, NE. Nebraska Department of Environmental Control and Army Core of Engineers.
599. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation of chlorinated solvents: field demonstrations and studies. October 1996, Kansas City, MO. Missouri Department of Environmental Control, Region 5 EPA, and Army Core of Engineers.
600. **Hazen, T. C.** Invited Seminar. Landfill leachate biotreatment. October 1996, Aiken, SC. Federal Facilities Quarterly Meeting (EPA-R4, SCDHEC, GAEPD, DOE-SRS).
601. **Hazen, T. C.** Invited Tour. Bioremediation demonstrations at SRS. October 1996, Aiken, SC. Tour of Japanese EPA (20 officials) of SRS sites.

602. **Hazen, T. C.** Invited Seminar. Bioremediation field demonstrations: Lessons learned. October 1996, Houghton, MI. Michigan Technological University.
603. Kastner, J. R., J. Radway, **T. C. Hazen**, K. H. Lombard, G. Burbage, D. J. Altman, M. M. Franck, F. A. Washburn, C. J. Berry, and R. L. Brigmon. Invited Seminar. Bioventing vs. prepared beds for remediation of petroleum contaminated sites. September 1996, Birmingham, AL. Emerging Technologies in Hazardous Waste Management VIII, American Chemical Society.
604. **Hazen, T. C.** Invited Seminar. Aerobic bioremediation of chlorinated solvents: field demonstrations and studies. September 1996, Zurich, Switzerland. EAWAG Swiss Institute.
605. Ulfig, K., G. Plaza, **T. C. Hazen**, C. B. Fliermans, M. M. Franck, and K. H. Lombard.. Contributed. Bioremediation Treatability and Feasibility Studies at a Polish Petroleum Refinery. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
606. Lombard, K. H., A. Worsztynowicz, **T. C. Hazen**, and B. Jagosz. Contributed. The Demonstration Of Bioremediation techniques for the clean up of a process waste lagoon at the Czechowice Oil Refinery in Czechowice-Dziedzice, Poland. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
607. **Hazen, T. C.**, K. H. Lombard, J. Wear, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, M. M. Franck and C. A. Eddy-Dilek. Contributed. Full Scale demonstration of in situ bioremediation of chlorinated solvents in the deep subsurface using gaseous nutrient biostimulation. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
608. **Hazen, T. C.**, K. H. Lombard, D. J. Altman, F. A. Washburn, C. J. Berry, J. D. Young, A. Bourquin, M. M. Franck, R. L. Brigmon, E. Becker, and J. Santo Domingo. Contributed. Bioremediation of groundwater at a sanitary landfill using biosparging and gaseous nutrient injection. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
609. Kastner, J. R., J. Radway, **T. C. Hazen**, K. H. Lombard, G. Burbage, D. J. Altman, M. M. Franck, F. A. Washburn, C. J. Berry, and R. L. Brigmon. Contributed. Bioventing vs. prepared beds for remediation of petroleum contaminated sites. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
610. **Hazen, T. C.** Invited Seminar. Advances in bioremediation of groundwater and soil. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
611. Altman, D. J., **T. C. Hazen**, R. Legrand, R. Hickey, K. H. Lombard, F. A. Washburn, and C. J. Berry. Invited. Methanotrophic treatment of contaminated well water using bioreactors. September 1996, Warsaw, Poland. Third International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe.
612. **Hazen, T. C.** Newspaper Article. Project will demonstrate remediation technology. September/October 1996, Atlanta, GA. Georgia Environmental News 3/9: 1.
613. **Hazen, T. C.** Invited. Bioremediation demonstrations at SRS - tour. August 1996, Aiken, SC. Faculty from the University of Tennessee.
614. **Hazen, T. C.** Invited. Biotechnology "work for others" at SRS. August 1996, Aiken, SC. SRS Environmental Advisory Committee.
615. **Hazen, T. C.** Invited Seminar. Biotechnology for SRS. August 1996, Washington, DC. DOE, DOD and visiting Poland Diplomats.
616. **Hazen, T. C.** Invited Seminar. Biotechnology for SRS. July 1996, Aiken, SC. Visiting Navy Command.
617. **Hazen, T. C.** Invited Seminar. Biotechnology for SRS. July 1996, Aiken, SC. TNX Operations.
618. **Hazen, T. C.** Invited Seminar. Biotechnology for SRS. July 1996, Aiken, SC. Visiting Army General.
619. **Hazen, T. C.** Invited Seminar. Bioremediation. June 1996, Minneapolis, MN. Army Ammunition Plant.
620. **Hazen, T. C.** Invited Seminar. Bioremediation. June 1996, St. Paul, MN. Minnesota Pollution Control Agency.
621. **Hazen, T. C.** Invited Seminar. Biostimulation using methane and PHOSter. June 1996, Nashville, TN. Southern Energy Board.
622. **Hazen, T. C.** Invited Seminar. Biotechnology for SRS. June 1996, Aiken, SC. Visiting Swiss officials.
623. **Hazen, T. C.** Invited Seminar. Bioremediation Optimization Plans at the D-area Oil Seepage Basin. June 1996, Columbia, SC. South Carolina Department of Health and Environmental Control.
624. **Hazen, T. C.**, and K. H. Lombard. Invited. Tours and presentations of bioremediation at the Poland demonstration site. May 1996, Katowice, Poland. Polish Institute for Ecology of Industrial Areas.
625. Franck\*, M. M., **T. C. Hazen**, K. H. Lombard, D. J. Altman, R. L. Brigmon, and C. B. Fliermans. Contributed. The use of immunoassay techniques for TPH and BTEX with diesel contaminated soils in a prepared bed bioreactor. May 1996, New Orleans, LA. Annual Meeting of the American Society for Microbiology.
626. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation Field Demonstration. May 1996, Chicago, IL. Northwestern University.

627. **Hazen, T. C.** Invited Presentation. Biostimulation. May 1996, Washington, DC. IBC Workshop on Bioremediation vs. Bioaugmentation.
628. **Hazen, T. C.** Invited Chairman. Biostimulation vs. Bioaugmentation Workshop. May 1996, Washington, DC. IBC Workshop on Bioremediation vs. Bioaugmentation.
629. **Hazen, T. C.** Invited Presentation. Groundwater technologies. May 1996, Washington, DC. IBC Conference on Innovative Remediation Technologies.
630. **Hazen, T. C.** Invited Chairman. Groundwater Session. May 1996, Washington, DC. IBC Conference on Innovative Remediation Technologies.
631. Feature Article in International Groundwater Technology 2:7-9. April 1996. How methane Injection attacks Chlorinated Solvents by J. A. Sutfin.
632. **Hazen, T. C.**, K. H. Lombard, J. R. Kastner, D. J. Altman, M. M. Franck, F. A. Washburn, C. J. Berry, and R. L. Brigmon. Invited Seminar. Bioventing vs. Prepared Beds for Remediation of Petroleum Contaminated Soil. March 1996, New Orleans, LA. Annual meeting of the American Chemical Society.
633. **Hazen, T. C.** Invited Seminar. Monitoring Bioremediation: the hope and the hype. February 1996, Berkeley, CA. Center for Environmental Biotechnology, Berkeley National Laboratory and University of California, Berkeley.
634. **Hazen, T. C.** Invited Seminar. Monitoring Bioremediation: the hope and the hype. February 1996, Caguas, PR. University of Turabo, Ana Menendez Foundation.
635. **Hazen, T. C.** TV interview. PHOSter technology transfer by Southeastern Technology Center. February 15, 1996. Channel 12 News 11 and morning show.
636. **Hazen, T. C.**, B. B. Looney, and K. H. Lombard. Invited Press Conference. PHOSter technology transfer by Southeastern Technology Center. February 1996, Aiken, SC. Aiken Municipal Building.
637. **Hazen, T. C.** Invited Tour and Presentation. Biotechnology at SRS. February 1996, Aiken, SC. U.S. Army Technology Center Representatives.
638. **Hazen, T. C.** Invited Tour and Presentation. Biotechnology at SRS. February 1996, Aiken, SC. Booz, Allen, Hamilton Inc.
639. **Hazen, T. C.** Invited Speaker. SRS Biotechnology. January 1996, Chicago, IL. Argonne National Laboratory.
640. **Hazen, T. C.** Invited Speaker. SRS Biotechnology. December 1995, Panama City, FL. Armstrong Laboratory, Tyndall USAF.
641. **Hazen, T. C.** Invited Keynote Speaker. Measuring Bioremediation. December 1995, Colorado Springs, CO. Institute for Gas Technologies Eighth International Symposium on Gas, Oil, and Environmental Biotechnology.
642. **Hazen, T. C.** Invited Speaker. SRS Biotechnology. December 1995, Aiken, SC. Utilities Industry Consortium. Seminar and Tour.
643. **Hazen, T. C.** Invited Speaker. SRS Biotechnology. December 1995, Aiken, SC. US Air Force Center for Environmental Excellence, Brooks AFB, San Antonio. Seminar and Tour.
644. **Hazen, T. C.** Invited Speaker. SRS Biotechnology. December 1995, Aiken, SC. Concurrent Technologies Corporation. Seminar and Tour.
645. **Hazen, T. C.** Invited Seminar. Bioremediation Demonstrations at DOE's Savannah River Site. November 1995, Charleston, South Carolina. Medical University of South Carolina.
646. **Hazen, T. C.** Invited Seminar. Field and Soil Column Studies of Reductive Dechlorination in Bulk Aerobic Aquifers. October 1995, Annapolis, Maryland. IBC's International Symposium on Biological Dehalogenation.
647. **Hazen, T. C.** Invited Seminar. Field Studies of Intrinsic Bioremediation of Chlorinated Solvents in Anaerobic/Aerobic areas. October 1995, Annapolis, Maryland. IBC's International Symposium on Intrinsic Bioremediation.
648. **Hazen, T. C.** Invited Seminar. Bioremediation Demonstrations at DOE's Savannah River Site. October 1995, Houghton, MI. Michigan Technological Institute.
649. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites - using the natural cleansing capacity of the environment. September 1995, Katowice, Poland. Institute for Industrial Ecology.
650. **Hazen, T. C.** Invited seminar and Organizer. Aerobic Bioremediation of Chlorinated Solvents. September 1995, Aberdeen, Scotland. International Symposium on Advances in Bioremediation sponsored by American Society for Microbiology and European Society of Microbiologists.
651. Arias, W., and **T. C. Hazen**. Contributed. Ability of an environmental *Escherichia coli* isolate to survive and multiply in algal exudates of tropical microbial epilithic communities. September 1995, Sao Paulo, BRAZIL. Seventh International Symposium on Microbial Ecology.
652. **Hazen, T. C.** Invited Seminar. Full-Scale Demonstration of In Situ Bioremediation of Chlorinated Solvents in the Deep Subsurface Using Gaseous Nutrient Biostimulation. September 1995, Sao Paulo, BRAZIL. Seventh International Symposium on Microbial Ecology.
653. **Hazen, T. C.** Invited Seminar. Bioremediation Demonstrations at the Savannah River Site. August 1995, Tallahassee, FL. Florida State University.

654. **Hazen, T. C.** Invited Seminar. Bioremediation of landfills with options for the Columbia County landfill. August 1995, Atlanta, GA. Georgia Environmental Protection Department.
655. **Hazen, T. C.** Invited Seminar. Bioremediation Demonstrations at the Savannah River Site. July 1995, Minneapolis, MN. Minnesota Pollution Control Agency.
656. **Hazen, T. C.** Invited Keynote Address. Importance of Interdisciplinary Interactions for Large Field Remediation Projects. July 1995, Gleneden Beach, Oregon. From the Flask to the Field: 1995 EPA Five Hazardous Substance Research Centers.
657. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Sanitary Landfills. July 1995, Washington, DC. National Research Council.
658. **Hazen, T. C.** Newspaper Article Interview. "Microbes clean chemical contaminates from soil" by Karin Schill. July 20 1995, Augusta, GA. Augusta Chronicle p 6C.
659. Legrand\*, R., R. Baker, and **T. C. Hazen**. Invited Seminar. Field Demonstration of the Methanotrophic Fluidized Bed Bioreactor at the Savannah River Site. June 1995, San Antonio, TX. 88Th Air and Waste Management Associations Annual Meeting and Exhibition.
660. **Hazen, T. C.** Invited Seminar and Tour. Bioremediation at SRS. June 1995, Aiken, SC. Visiting Provost University of South Carolina.
661. **Hazen, T. C.** Invited Seminar and Tour. Bioremediation at SRS. June 1995, Aiken, SC. Visiting Group from Minnesota Department of Environmental Protection.
662. Hazen\*, T. C., D. Altman, and K. H. Lombard. Invited Seminar. Bioremediation Options for the Columbia County Landfill. June 1995, Evans, GA. Columbia County Board of Commissioners.
663. **Hazen, T. C.** Invited Seminar and Tour. Bioremediation at SRS. June 1995, Aiken, SC. Visiting Group of State, County and Municipal Regulators from around South Carolina.
664. Fliermans\*, C. B., M. M. Franck, **T. C. Hazen**, and R. W. Gorden. Contributed. Ecofunctional Enzymes of Microbial Communities in Groundwater. May 1995, Washington, D.C. Annual Meeting of the American Society for Microbiology.
665. **Hazen, T. C.** Feature Newspaper Article. Teams from SRS Snare a Pair of Signature Awards by Pat Weber. June 1995, Aiken, SC. SRS News pg 1.
666. Hazen\*, T. C., K. H. Lombard, B. B. Looney, M. Enzien, J. M. Dougherty, C. B. Fliermans, and C. A. Eddy-Dilek. Contributed. Bioremediation Visualization Using 3D Models of Parameters. May 1995, Washington, D.C. Annual Meeting of the American Society for Microbiology
667. **Hazen, T. C.** Invited. Methanotrophic Bioreactor Demonstration for Ground Water Cleanup. May 1995. Strategic Environmental Research and Development Program, Scientific annual program review. Washington, DC.
668. **Hazen, T. C.** Newspaper Article. Superheroes: Mother Nature provides a new breed of Pollution-eating microbes used to clean up waste at Savannah River Site by M. Livingston. May 2 1995, Columbia, SC. The State page D1 and D2. Circulation: 171,200.
669. Lombard, K. H., M. M. Franck\*, and **T. C. Hazen**. Contributed. The Savannah River Site sOILS Facility: Immunoassay Techniques for TPH and BTEX Contamination Monitoring in a Soils Bioremediation Facility. April 1995, San Diego, CA. In Situ and On-Site Bioreclamation, The Third International Symposium.
670. **Hazen, T. C.**, A. W. Bourquin\*, N. O'Halloran, K. Lombard, D. Jackson, C. J. Berry, and C. Lockett. Contributed. In Situ Optimization Studies for Bioremediation of a Sanitary Landfill Groundwater Plume. April 1995, San Diego, CA. In Situ and On-Site Bioreclamation, The Third International Symposium.
671. Hazen\*, T. C., K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, J. Wear, and C. A. Eddy-Dilek. Invited Seminar. In Situ Bioremediation Via Horizontal Wells. April 1995, San Diego, CA. In Situ and On-Site Bioreclamation, The Third International Symposium.
672. Eddy-Dilek, C A, R. L. Nichols, R. N. Sims, B. B. Looney, E. L. Funderburk, and **T. C. Hazen\***. Contributed. Video Animation of New Technologies for Cleanup of Solvents in Soils and Groundwater. April 1995, San Diego, CA. In Situ and On-Site Bioreclamation, The Third International Symposium.
673. Gorden, R. W., **T. C. Hazen\***, K. Lombard, T. Hayes, R. Legrand, R. Hickey, and F. Sappington. Contributed. Methanotrophic Hybrid Bioreactors for on Site Bioremediation. April 1995, San Diego, CA. In Situ and On-Site Bioreclamation, The Third International Symposium.
674. **Hazen, T. C.** Invited Seminar. Methanotrophic Bioreactors for Treatment of Groundwater Contaminated with Chlorinated Solvents. April 1995, Washington, DC. Strategic Environmental Research and Development Program Annual Symposium.
675. **Hazen, T. C.** and K. H. Lombard. Invited Seminar. SRS Sanitary Landfill Bioremediation Optimization Test. April 1995, Columbia, SC. South Carolina Department of Health and Environmental Control RCRA Group.
676. **Hazen, T. C.** Invited Seminar. Full Scale In Situ Bioremediation Demonstration of Chlorinated Solvent Contamination in Soil and Groundwater. April 1995, Atlanta, GA. Department of Environmental Engineering, Georgia Institute of Technology.

677. **Hazen, T. C.** Invited Seminar. Bioremediation of organic vapors. April 1995, Rochester, NY. Kodak Corporation
678. **Hazen, T. C.** Feature Article Pictures. Bioremediation by R. Atlas. April 3 1995, New York, NY. Chemical & Engineering News 73(14):32-42
679. **Hazen, T. C.** Newsletter. In situ Bioremediation via horizontal wells. March 1995, Denver, CO. Horizontal News 1(1):4.
680. **Hazen, T. C.** Invited Seminar. Advances in Bioremediation of Soil and Groundwater at U. S. Department of Energy Sites. March 1995, Tahoe, CA. Keystone Symposia on Environmental Biotechnology.
681. **Hazen, T. C.** Invited Seminar. Monitoring of in situ Biodegradations. March 1995, Knoxville, TN. Third International Symposium on the Interface between Analytical Chemistry and Microbiology.
682. **Hazen, T. C.,** C. J. Berry, and R. Brigmon. Invited. Mobile Methanotrophic Bioreactor for Groundwater Cleanup. February 1995, Augusta, GA. SRS Engineering Day Symposium at the Augusta Civic Center.
683. **Hazen, T. C.** Newsletter. Patent 5384048. Bioremediation of Contaminated Groundwater. February 1995, Washington, DC. The Bioremediation Report 4(2):11.
684. **Hazen, T. C.** Bioremediation at SRS. February 1995, Aiken, SC. Special seminar to Board of Directors of Westinghouse Savannah River Company and Westinghouse Electric Company.
685. **Hazen, T. C.** Invited. Bioremediation at SRS and Tour. January 1995, Aiken, SC. Special seminar and tour for the SRS Environmental Advisory Committee.
686. **Hazen, T. C.** Invited Seminar. Bioremediation of Groundwater. December 1994, Atlanta, GA. Westinghouse Waste & Environmental Information Exchange.
687. **Hazen, T. C.** Invited Seminar. Bioremediation at the Savannah River Site. December 1994, Washington, D.C. Special seminar for the U. S. Department of Energy Biotechnology Interlaboratory Council.
688. **Hazen, T. C.** Seminar and Tour. Bioremediation at the Savannah River Site. November 1994, Aiken, SC. Special seminar and tour for representatives from Spelman College, Atlanta, Georgia.
689. **Hazen, T. C.** Invited Seminar. Full-Scale Bioremediation Demonstrations at the Savannah River Site. November 1994, Columbia, SC. Department of Civil Engineering, University of South Carolina.
690. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation Demonstration (Methane Biostimulation) of the Savannah River Site Integrated Demonstration Project. November 1994, Logan, UT. Department of Environmental Engineering. Utah State University.
691. **Hazen, T. C.,** K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, John Wear, and C. A. Eddy-Dilek. Invited Seminar. In Situ Bioremediation Demonstration (Methane Biostimulation) of the Savannah River Site Integrated Demonstration Project. November 1994, Hanford, WA. DOE Hanford Symposium.
692. **Hazen, T. C.** Newspaper Article. Drillers find lost world of ancient microbes by W. J. Broad (picture). October 4 1994, New York, NY. New York Times pg B9.
693. **Hazen, T. C.** Article in Trade Journal. The sOILS Facility for the Bioremediation of petroleum contaminated soil was used as an example in Environmental Feature on "Choosing the Right Remediation Contractor". October 1994, Washington, DC. The Engineers Digest (cir. 123,600) p. 62-65.
694. **Hazen, T. C.** Invited Seminar. Bioremediation at the Savannah River Site. October 1994, Columbia, SC. Special Seminar for State Senator.
695. Lombard, K. H., and **T. C. Hazen.** Invited Seminar. a petroleum contaminated soil bioremediation facility. August 1994, Atlanta, GA. American Nuclear Society Spectrum94.
696. **Hazen, T. C.,** K. H. Lombard, B. B. Looney, M. V. Enzien, J. M. Dougherty, C. B. Fliermans, John Wear, and C. A. Eddy-Dilek. Invited Seminar. Preliminary Technology Report for In Situ Bioremediation Demonstration (Methane Biostimulation) of the Savannah River Site Integrated Demonstration Project. August 1994, Atlanta, GA. American Nuclear Society Spectrum94.
697. **Hazen, T. C.** Newspaper Article. SRS celebrates milestone in ground water treatment by S. D. Hale (interview). August 1994, Augusta, GA. Augusta Chronicle.
698. **Hazen, T. C.** Newsletter. Patent 5,324,661 Chemotactic selection of pollutant degrading soil bacteria was featured in the Patents section. July 1994, Washington, DC. The Bioremediation Report 3(7):11.
699. **Hazen, T. C.** Newsletter. Savannah River Opens Cleanup Facility. Article on sOILS Bioremediation Facility. July 1994, Washington, DC. DOE This Month.
700. **Hazen, T. C.** Magazine Article. Researchers use SCE&G natural gas for clean-ups. July 1994, Washington, DC. SCANA Insights pg 28 (interview)
701. Fliermans\*, C. B., **T. C. Hazen,** and R. L. Tyndall. Contributed. Decade of Monitoring Legionella pneumophila in Southeastern Cooling Towers. June 1994, Orlando, FL. ASHRAE Annual Symposium
702. **Hazen, T. C.** Newsletter. SRS Integrated Demo, In Situ Bioremediation, Bioreactor project will demonstrate gas-phase bioremediation, sOILS Facility uses naturally occurring microbes to cleanup oil in soils. June 1994, Washington, DC. DOE TIE Quarterly Vol. 3 pgs 6, 10, 11, and 13

703. **Hazen, T. C.** Newspaper Article. "Good environmental news at SRS" by Charles Ray. June 4, 1994, Charleston, SC. Charleston Post & Courier pg 18A.
704. **Hazen, T. C.** Invited Seminar. Bioremediation at SRS. June 1994, Aiken, SC (SRS). Meeting with representatives of Institute for Wood Research.
705. **Hazen, T. C.** Newspaper Article. SRS takes up raising bugs?? by Pat Weber. June 1994, Aiken, SC. SRS News pg 6.
706. **Hazen, T. C.** Newspaper Article. Microbe Recruits Devour Smorgasbord of Pollution Interview of **T. C. Hazen**. May 28 1994, Cleveland, OH. The Cleveland Plain Dealer: Page 10A.
707. **Hazen, T. C.** Newspaper Article. Weapons Plant Cleanup: Army of soil microbes wins war on toxic waste by Mike Toner Interview of **T. C. Hazen**. May 27 1994, Atlanta, GA. The Atlanta Journal/The Atlanta Constitution: Page A4.
708. Fliermans, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey\*, and **T. C. Hazen**. Contributed. Use of Biolog Technology to assess remediation and groundwater perturbations. May 1994, Las Vegas, NV. Annual Meeting of the American Society for Microbiology.
709. Enzien\*, M. V., **T. C. Hazen**, C. B. Fliermans, M. M. Franck, and P. McKinsey. Contributed. Microbial community structure in unsaturated sediments during in situ bioremediation of chlorinated solvents. May 1994, Las Vegas, NV. Annual Meeting of the American Society for Microbiology.
710. Hazen\*, T. C., B. B. Looney, M. Enzien, J. M. Dougherty, J. Wear, C. B. Fliermans, and C. A. Eddy. Contributed. In Situ Bioremediation of Chlorinated-Solvents Via Horizontal Wells. May 1994, Las Vegas, NV. Annual Meeting of the American Society for Microbiology.
711. **Hazen, T. C.** Newspaper Article. SRS sees Future in Soil Bacteria, Researchers Say by Stephan Delaney Hale. Interviews and pictures of **T. C. Hazen** and K. H. Lombard. May 21 1994, Augusta, GA. Augusta Chronicle Pages 15-16A.
712. **Hazen, T. C.** Invited Seminar. SRS Bioremediation Technologies. April 1994, Aiken, SC. Andrews Environmental.
713. **Hazen, T. C.** Invited Seminar. Advances in Bioremediation. April 1994, Aiken, SC. Annual meeting of the South Carolina Academy of Science.
714. **Hazen, T. C.** TV Interview Video. "DOE Strategic Plan 'Town Meeting' National Teleconference. 11 am April 26 1994, DOE Complex. DOE Complex, 74 minutes.
715. **Hazen, T. C.** Invited. Earth Day seminar on "Pollution". April 21, 1994. Augusta, GA. Sixth Grade Science Classes at Tutt Middle School in Augusta.
716. **Hazen, T. C.** Invited. Bioremediation at SRS. March 1994. SRS, Aiken, SC. AMTEX, American Textiles Industry Consortium.
717. **Hazen, T. C.** Invited. Methanotrophic Bioreactor Demonstration for Ground Water Cleanup. March 1994, Washington, DC. Strategic Environmental Research and Development Program, Scientific Advisory Board.
718. **Hazen, T. C.** Invited. Methanotrophic Bioremediation Demonstrations at SRS. March 1994, Aiken, SC. South Carolina Electric and Gas Company at SRS with Tour of SRS.
719. **Hazen, T. C.**, B. B. Looney, M. Enzien, J. M. Dougherty, J. Wear, C. B. Fliermans, and C. A. Eddy. Contributed. In Situ Bioremediation of Chlorinated Solvents Via Horizontal Wells. March 1994. Atlanta, GA. Second International Conference on Groundwater Ecology sponsored by the EPA and the American Water Resources Association.
720. Fliermans\*, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey and **T. C. Hazen**. Contributed. Immunological Techniques As Tools To Characterize The Subsurface Communities In Pristine and Contaminated Sites. March 1994. Atlanta, GA. Second International Conference on Groundwater Ecology sponsored by the EPA and the American Water Resources Association.
721. **Hazen, T. C.** Newspaper Article. Got contaminated soil? Get your PHOSter here by Pat Weber (interview and picture). March 1994, Aiken, SC. SRS News.
722. **Hazen, T. C.** Invited Seminar. Advances in Bioremediation of Soil and Groundwater. February, 1994, Chicago, IL. Pittsburgh Conference annual meeting.
723. **Hazen, T. C.** Invited Seminar. Bioremediation of DOE Waste Sites. February, 1994, Tempe, AZ. Arizona State University.
724. **Hazen, T. C.**, K. Lombard, and C. Berry. Invited Poster. Methanotrophic bioreactors for the remediation of solvent contaminated ground water. February, 1994, Augusta, GA. WSRC/BSRI technical day at the Augusta/Richmond County Civic Center in Augusta, Georgia.
725. **Hazen, T. C.**, K. Lombard, J. M. Dougherty, M. Enzien, J. Wear, C. B. Fliermans, and C. A. Eddy. Invited Poster. In Situ Bioremediation Via Horizontal Wells. February, 1994, Augusta, GA. WSRC Environmental Restoration Department. WSRC/BSRI technical day at the Augusta/Richmond County Civic Center in Augusta, Georgia.

726. **Hazen, T. C.** Invited Poster. sOILS Facility for Bioremediation of Petroleum Contaminated Soil. February, 1994, Augusta, GA. WSRC Environmental Restoration Department. WSRC/BSRI technical day at the Augusta/Richmond County Civic Center in Augusta, Georgia.
727. **Hazen, T. C.** Newspaper Article. "SRS gets \$1.6 million for Environmental Cleanup" by S. D. Hale. Wednesday February 17 1994, Augusta, GA. Augusta Chronicle.
728. **Hazen, T. C.** Invited. Integrated In Situ Bioremediation Demonstration. February 1994, Houston, TX. Mid-Year Review DOE-OTD-In Situ Remediation Integrated Program.
729. **Hazen, T. C.** Invited Seminar. sOILS Facility for Bioremediation of Petroleum Contaminated Soil. February 1994, Aiken, SC. WSRC Environmental Restoration Department.
730. **Hazen, T. C.** Invited. Integrated In Situ Bioremediation Demonstration. February 1994, Augusta, GA. Mid-Year Review. DOE-OTD-Integrated Demonstration Program.
731. **Hazen, T. C.** Newspaper Article. New Money for Bioreactor Research. January 1994, Aiken, SC. SRS News Circulation 20,000.
732. **Hazen, T. C.** Invited Seminar. SRS Sanitary Landfill Treatability Study. January 1994, Aiken, SC. WSRC Environmental Restoration Department.
733. **Hazen, T. C.** Invited. Methanotrophic Bioreactor Demonstrations Proposal. January 1994, Los Alamos, New Mexico. Scientific Advisory Board, Strategic Environmental Research and Development Program (DOD-DOE-EPA).
734. **Hazen, T. C.** Invited Seminar. Bioremediation Needs and Future. December 1993, Columbia, SC. South Carolina University Research and Education Foundation Strategic Planning Committee.
735. **Hazen, T. C.** Invited Seminar. Bioremediation of DOE Waste Sites. December 1993, Bloomington, IN. Indiana University.
736. **Hazen, T. C.** Integrated In Situ Bioremediation Demonstration. Invited Seminar. December 1993, Bloomington, IN. Indiana University.
737. **Hazen, T. C.**, J. M. Dougherty, M. Enzien, J. Wear, C. B. Fliermans, C. A. Eddy, and K. Lombard. Invited Seminar. In Situ Bioremediation Via Horizontal Wells. December 1993, Colorado Springs, CO. Institute for Gas Technologies Sixth International Symposium on Gas, Oil, and Environmental Biotechnology.
738. **Hazen, T. C.** Magazine Article. SRS - Inventing the Future! By D. McDonald (Pictures and interview). October 1993, New York, NY. The Business Journal pgs 20-22, 40.
739. Hazen\*, T. C., J. M. Dougherty, M. Enzien, M. M. Franck, C. B. Fliermans, and C. A. Eddy. Invited Speaker. In Situ Bioremediation Via Horizontal Wells. September 1993, Atlanta, GA. Emerging Technologies in Hazardous Waste Management V, The Industrial & Engineering Chemistry Division of the American Chemical Society.
740. Fliermans, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey, and **T. C. Hazen\***. Contributed. Use of BIOLOG® technology to access remediation and groundwater perturbations. September 1993, Salamanca, Spain. 11th International Symposium on Environmental Biogeochemistry.
741. Fliermans\*, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey, and **T. C. Hazen**. Contributed. Immunological techniques as tools to characterize the subsurface communities in pristine and contaminated sites. September 1993, Salamanca, Spain. 11th International Symposium on Environmental Biogeochemistry.
742. Fliermans, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey, and **T. C. Hazen\***. Contributed. Use of BIOLOG® technology to access remediation and groundwater perturbations. September 1993, Bath, United Kingdom. International Symposium on Subsurface Microbiology.
743. Fliermans\*, C. B., J. E. Wear, M. M. Franck, P. C. McKinsey, and **T. C. Hazen**. Contributed. Immunological techniques as tools to characterize the subsurface communities in pristine and contaminated sites. September 1993, Bath, United Kingdom. International Symposium on Subsurface Microbiology.
744. **Hazen, T. C.** Invited Seminar. SRS In Situ Bioremediation Integrated Demonstration. September 1993, Manhattan, Kansas. EPA/HSRC & Kansas State University Seminar.
745. **Hazen, T. C.** Invited Seminar. Biodegradation of Chlorinated Solvents and Vegetation Enhancement. September 1993, Manhattan, Kansas. EPA/HSRC & Kansas State University Seminar.
746. **Hazen, T. C.** Radio Interview. SRS In Situ Bioremediation Integrated Demonstration. September 1993, Manhattan, Kansas. Kansas State University Radio
747. **Hazen, T. C.** Invited Seminar. Deep Subsurface Microbiology. September 1993, Manhattan, Kansas. Department of Agronomy, Kansas State University.
748. **Hazen, T. C.** Invited Seminar. SRS In Situ Bioremediation Integrated Demonstration. September 1993, Knoxville, TN. Graduate Course on Microbiological Site Assessment: Characterization and Monitoring.
749. **Hazen, T. C.** Invited Seminar. SRS In Situ Bioremediation General Principals. September 1993, Knoxville, TN. Graduate Course on Microbiological Site Assessment: Characterization and Monitoring.
750. **Hazen, T. C.** Newspaper Article. Lets make a deal by Pat Weber (picture and interview). September 1993, Aiken, SC. SRS News.

751. Edwards, N. T., B. T. Walton, T. A. Anderson, J. J. Beauchamp, L. W. Cooper, R. J. Luxmoore, E. G. O'Neill, G. S. Sayler, D. C. White, and **T. C. Hazen**. Invited Seminar. The Use of Vegetation for Bioremediation of Surface Soils Contaminated with Trichloroethylene. August 1993, Augusta, GA. SRS-DOE Supplier Information Exchange Forum.
752. Lombard\*, K. H., J. Borthen, and **T. C. Hazen**. Invited Seminar. Design and Configuration Management of System Control Components for in situ Methanotrophic Bioremediation of Groundwater and Sediment Contaminated with Chlorinated Hydrocarbons. August 1993, Augusta, GA. SRS-DOE Supplier Information Exchange Forum.
753. **Hazen, T. C.**, and K. Lombard. Invited Seminar. Full-Scale Prepared Bed Bioremediation Facility for Petroleum-Contaminated Soil. August 1993, Augusta, GA. SRS-DOE Supplier Information Exchange Forum.
754. Berry\*, C. J., and **T. C. Hazen**. Invited Seminar. Methanotrophic Treatment of Contaminated Well Water Using a Pilot Scale Bioreactor. August 1993, Augusta, Georgia, SRS-DOE Supplier Information Exchange Forum.
755. Borthen\*, J., F. Meyer, K. Lombard, and **T. C. Hazen**. Contributed. Catalytic oxidation of trichloroethylene and perchloroethylene mixtures. August 1993, San Francisco, CA. American Institute of Chemical Engineers 1993 Summer National Meeting: Control and Measurement of VOC Emissions.
756. **Hazen, T. C.** Newspaper Article and Pictures. The Integrated Demonstration: An Update. Summer 1993, Aiken, SC. SRS Environmental Bulletin 4(10):1-5 Circulation 20,000.
757. Hazen\*, T. C. Invited Seminar. Full-Scale Prepared Bed Bioremediation Facility for Petroleum-Contaminated Soil. July 1993, Aiken, SC. Savannah River Site Central Environmental Committee.
758. **Hazen, T. C.** Newspaper Article and Pictures. Bioremediation Sampling in M Area. July 28 1993, Aiken, SC. SRS News Circulation 20,000.
759. Hazen\*, T. C., J. M. Dougherty, M. Enzien, M. M. Franck, C. B. Fliermans, and C. A. Eddy. Invited Seminar Convener. In Situ Bioremediation Via Horizontal Wells. July 1993, San Francisco, CA. Annual Meeting of the American Society of Civil Engineers.
760. **Hazen, T. C.** Magazine Feature Article. "Team tests trio of technologies" by Steven W. Setzer. June 28 1993, New York, NY. Engineering News Record 230:46-47.
761. **Hazen, T. C.** Magazine Feature Article. May 1993. U.S. Site Cleanups: A New Approach by I. Kim, G. Parkinson, S. Moore, and D. Kearns. CE 100(5):30.
762. **Hazen, T. C.** Invited Instructor. Bioremediation Ecological Risk Assessment. June 1993, Fort Collins, CO. Short Course on Ecological Risk Assessment and Management, Department of Fisheries and Wildlife Biology, Colorado State University.
763. Wear\*, J. E., P. C. McKinsey, M. M. Franck, H. G. Findley, M. V. Enzien, C. B. Fliermans, and **T. C. Hazen**. Contributed. A Most-Probable-Number Assay Using BIOLOG-GN Microtiter Plates for the Study of Groundwater Microbial Communities. May 1993, Atlanta, GA. Annual Meeting of the American Society for Microbiology.
764. Fliermans\*, C. B., J. M. Dougherty, M. M. Franck, P. C. McKinsey, and **T. C. Hazen**. Contributed. Immunological Techniques as Tools to Characterize the Subsurface Microbial Community at a Trichloroethylene-Contaminated Site. May 1993, Atlanta, GA. Annual Meeting of the American Society for Microbiology.
765. Hazen\*, T. C., J. M. Dougherty, and C. B. Fliermans. Contributed. In Situ Bioremediation of Chlorinated Solvents by Using Horizontal Wells to Inject Air and Methane. May 1993, Atlanta, GA. Annual Meeting of the American Society for Microbiology.
766. **Hazen, T. C.** Invited. SRS In Situ Bioremediation Integrated Demonstration. May 1993, Augusta, Georgia, EPA/HSRC & SRTC Technology Development Exchange Meeting.
767. **Hazen, T. C.** Contributed. Bioremediation Programs at SRS. May 1993, Augusta, Georgia, EPA/HSRC & SRTC Technology Development Exchange Meeting.
768. **Hazen, T. C.** Contributed. Methanotrophic Bioreactor Demonstrations Proposal. April 1993, Washington, DC Scientific Advisory Board, Strategic Environmental Research and Development Program (DOD-DOE-EPA).
769. **Hazen, T. C.** Invited Seminar Chairman and Speaker. In Situ Bioremediation of Groundwater. April 1993, San Juan, PR. American Society for Microbiology Conference on Water Quality in the Western Hemisphere.
770. Edwards\*, N. T., B. T. Walton, T. A. Anderson, J. J. Beauchamp, L. W. Cooper, R. J. Luxmoore, E. G. O'Neill, G. S. Sayler, D. C. White, and **T. C. Hazen**. Contributed. The Use of Vegetation for Bioremediation of Surface Soils Contaminated with Trichloroethylene. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
771. Lombard\*, K. H., J. Borthen, and **T. C. Hazen**. Contributed. Design and Configuration Management of System Control Components for in situ Methanotrophic Bioremediation of Groundwater and Sediment Contaminated with Chlorinated Hydrocarbons. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.

772. Enzien\*, M. V., F. W. Picardal, **T. C. Hazen**, and R. G. Arnold. Contributed. Biodegradation of Trichloroethylene and Tetrachloroethylene under Aerobic Conditions with Methane Addition in a Sediment Column. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
773. Dougherty, J. M., C. J. Berry, M. M. Franck, and **T. C. Hazen\***. Contributed. Characterization of the Subsurface Microbial Community from a Trichloroethylene Contaminated Site. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
774. Berry\*, C. J., **T. C. Hazen**, M. M. Franck, and J. Rossabi. Contributed. Methanotrophic Treatment of Contaminated Well Water Using a Pilot Scale Bioreactor. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
775. Morrissey, C. M., S. E. Herbes, A. V. Palumbo\*, T. J. Phelps, and **T. C. Hazen**. Invited Seminar. Use of Laboratory Soil Columns to Optimize in situ Biotransformation of Tetrachloroethylene. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
776. Fliermans\*, C. B., J. M. Dougherty, M. M. Franck, P. C. McKinsey and **T. C. Hazen**. Invited Seminar. Immunological Techniques as Tools to Characterize the Subsurface Microbial Community at a Trichloroethylene Contaminated Site. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
777. Hazen\*, T. C., J. M. Dougherty, C. B. Fliermans, and B. B. Looney. Invited Seminar. Bioremediation of Soil and Groundwater at a Chlorinated Solvent Contaminated Site using Horizontal Wells to Inject Air. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
778. Hazen\*, T. C., J. M. Dougherty, and C. B. Fliermans. Invited Seminar. DOE/SRS Integrated Demonstration: In Situ Bioremediation of Soil and Groundwater at a Chlorinated Solvent Contaminated Site using Horizontal Wells to Inject Air and Methane. April 1993, San Diego, CA. In Situ and On-Site Bioreclamation, The Second International Symposium.
779. **Hazen, T. C.** Invited Seminar. Bioremediation Ecological Risk Assessment. March 1993, Fort Collins, CO. Department of Fisheries and Wildlife Biology, Colorado State University.
780. **Hazen, T. C.** Invited Seminar. Bioreactors and Vegetation Enhancement of Bioremediation of Chlorinated Solvents. March 1993, Houston, TX. DOE/Office of Technology Transfer Investigators Review.
781. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. February 25, 1993, Augusta, GA. Technology Transfer Seminar for Industry.
782. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. February 23, 1993, Augusta, GA. Technology Transfer Seminar for Industry.
783. **Hazen, T. C.** Invited Seminar. The Environment and Environmental Scientists. February 1993, Augusta, GA. Warren Road Elementary School.
784. **Hazen, T. C.** Invited Seminar. Bioremediation Demonstrations at SRS. February 1993, Pittsburgh, PA. Westinghouse Technology Transfer Council.
785. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. January 1993, Washington, DC. Department of Energy, Office of Technology Development.
786. **Hazen, T. C.** Invited Seminar. Bioremediation at SRS. January 1993, San Antonio, TX. American Academy of Microbiology, Colloquia on Field Research in Bioremediation.
787. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. December 1992, Columbia, SC. South Carolina Department of Health and Environmental Control.
788. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Sanitary Landfills. November 1992, Aiken, SC. Westinghouse Savannah River Company Environmental Restoration Department.
789. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. November 1992, Houston, TX. Department of Environmental Engineering, Rice University.
790. Hazen\*, T. C., J. M. Dougherty, M. Enzien, M. M. Franck, C. B. Fliermans, C. A. Eddy, and K. H. Lombard. Contributed. DOE/SRS Integrated Demonstration: In Situ Bioremediation of Soil and Groundwater. November 1992, Pleasanton, CA. DOE Technology Information Exchange: Remediation.
791. **Hazen, T. C.** Invited Seminar. Environmental Research. October 1992, Augusta, GA. Richmond County Schools Education Improvement Program.
792. **Hazen, T. C.** Invited Seminar. Science Fair Workshop for Wheelless Road Elementary School. October 1992, Augusta, GA. Group Leader.
793. Looney\*, B. B., D. S. Kaback, **T. C. Hazen**, and J. C. Corey. Contributed. Environmental restoration using horizontal wells: A field demonstration. September 1992, Atlanta, GA. American Chemical Society Symposium on Emerging Technologies for Hazardous Waste Management.
794. **Hazen, T. C.** Invited Symposium Speaker. Monitoring In Situ Bioremediation. September 1992, Niagara-on-the-Lake, Canada. International Symposium on In Situ Bioremediation'92 sponsored by Environment Canada.

795. **Hazen, T. C.** Invited Symposium Speaker. In Situ Bioremediation Demonstrations at SRS. September 1992, Grand Rapids, MI. International Symposium on the Implementation of Biotechnology in Industrial Waste Treatment and Bioremediation. Sponsored by Michigan Biotechnical Institute.
796. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation of Chlorinated Solvents using Injection of air/Methane via Horizontal Wells. September 1992, Clemson, SC. Department of Biological Sciences, Clemson University.
797. **Hazen, T. C.** Magazine Feature Article. "SRS Pitches Cleanup Technology; confers Award on 151". September 1992, Aiken, SC. Technology Transfer Report pg. 11.
798. **Hazen, T. C.** Newspaper Article and Interview. "Bacteria Cleanup SRS". Wednesday September 2 1992, Aiken, SC. Aiken Standard Circulation: 18,000.
799. **Hazen, T. C.** Newspaper Article. "Bacteria could aid waste cleanup". Wednesday September 2 1992, Charlotte, NC. Charlotte Observer pg 5C.
800. **Hazen, T. C.** Newspaper Article and Interview. "Bacteria Topic of Seminar" by S. D. Hale. Wednesday September 2 1992, Augusta, GA. Augusta Chronicle.
801. **Hazen, T. C.** TV Interview. Groundwater Cleanup Technology. September 1 1992, Augusta, GA. 6 PM and 11 PM News Channel 26.
802. **Hazen, T. C.** TV Interview. Groundwater Cleanup Technology. September 1 1992, Augusta, GA. 6 PM and 11 PM News Channel 12.
803. **Hazen, T. C.** Invited. SRS Bioremediation Technology Licensing Symposium. September 1992, Augusta, GA. SRS Technology Transfer Symposium.
804. **Hazen, T. C.** Invited Seminar. In Situ Bioremediation Demonstrations at SRS. August 1992, Pittsburgh, PA. Westinghouse Science and Technology Center.
805. Hazen\*, T. C., J. M. Dougherty, C. B. Fliermans, and B. B. Looney. Invited Symposium Speaker. Full Scale Underground Injection of Air, Methane, and Other Gases via Horizontal Wells for In Situ Bioremediation of Chlorinated Solvent Contaminated Ground Water and Soil. August 1992, Minneapolis, MN. American Institute of Chemical Engineers annual meeting.
806. **Hazen, T. C.** Newspaper Article and Interview. "Growth Amid the Ruins" by Charles Pope. June 28 1992, Columbia, SC. Sunday Feature (front page) The State Note: Sunday Circulation: 171,200.
807. **Hazen, T. C.** Newsletter Article and Interview. Breakthrough clean water technologies demonstrated at SRS. Spring 1992, Aiken, SC. SRS Environmental Bulletin 3(6):4.
808. **Hazen, T. C.** Newspaper Article and Interview. "Cleaner Groundwater Is Subject of SRS Research". Thursday April 9 1992, Aiken, SC. Aiken Standard Circulation: 18,000.
809. Hazen\*, T. C., J. M. Dougherty, and B. B. Looney. Contributed. Stimulation of Ground Water and Sediment Communities at a Trichloroethylene Contaminated Site. May 1992, New Orleans, LA. American Society for Microbiology Annual Meeting.
810. Enzien\*, M., F. Picardal, **T. C. Hazen**, and B. Arnold. Contributed. Effects of TCE and methane exposure on microbial community dynamics in a sediment column. May 1992, New Orleans, LA. American Society for Microbiology Annual Meeting.
811. Dougherty\*, J. M., M. M. Franck, C. B. Fliermans, and **T. C. Hazen**. Contributed. Characterization of the Subsurface Microbial community from a Trichloroethylene Contaminated Site. May 1992, New Orleans, LA. American Society for Microbiology Annual Meeting.
812. **Hazen, T. C.** Invited Symposium Speaker. In Situ Bioremediation Demonstrations at SRS. May 1992, New Orleans, LA. American Society for Microbiology Annual Meeting.
813. **Hazen, T. C.** Workshop Chairman. Emerging Technologies in Bioremediation. May 1992, New Orleans, LA. American Society for Microbiology Training Workshop.
814. **Hazen, T. C.** Interview. Cleaner Groundwater is Subject of SRS Research. Article for Aiken Standard newspaper (circulation 18,000). April 9, 1992.
815. **Hazen, T. C.** Invited Seminar and Discussions. Bioremediation of DOE wastes, lessons from oil-contaminated soil. March 1992, Golden, CO. Rocky Flats EG&G Environmental Restoration Department.
816. McCabe, D. J., A. W. Wiggins, M. R. Poirier, and **T. C. Hazen**. Contributed. Biofouling of Microfilter at the Savannah River Site F/H-Area Effluent Treatment Facility. March 1992, Tucson, AZ. Waste Management '92.
817. **Hazen, T. C.** Invited Seminar. Deep Subsurface Microbiology - Traveling Lecture. February 1992, St. Petersburg, FL. Eckerd College.
818. Fliermans\*, C. B., **T. C. Hazen**, and R. L. Tyndall. Contributed. Decade of Monitoring Legionella pneumophila in Southeaster Cooling Towers. January 1992, Orlando, FL. Fourth International Symposium on Legionella.
819. Fliermans\*, C. B., **T. C. Hazen**, and R. L. Tyndall. Contributed. Modified Direct Fluorescent Antibody Technique as a Monitoring Tool for Legionella. January 1992, Orlando, FL. Fourth International Symposium on Legionella.
820. **Hazen, T. C.** Invited Seminar. SRS Integrated Demonstration: Bioremediation Tasks. January 1992, New Orleans, LA. Gas Research Institute Environmental Advisors annual meeting.

821. **Hazen, T. C.** Invited Seminar/Convener. SRS Integrated Demonstration: Bioremediation Tasks. December 1991, Colorado Springs, CO. Fourth International Institute for Gas Technology Symposium on Gas, Oil, Coal and Environmental Biotechnology.
822. **Hazen, T. C.** Invited Seminar. Integrated Demonstration Project Bioremediation Tasks for FY92. November 1991, Aiken, SC. WSRC Environmental Restoration Department Special Seminar.
823. **Hazen, T. C.** Invited Seminar. In-Situ Bioremediation of SRS Waste Sites. November 1991, Augusta, GA. US Department of Energy, Office of Environmental Restoration Technology Information Exchange Workshop.
824. **Hazen, T. C.** Invited Seminar. Ex-Situ Bioremediation of SRS Waste Sites. November 1991, Augusta, GA. US Department of Energy, Office of Environmental Restoration Technology Information Exchange Workshop.
825. **Hazen, T. C.** and C. Berry\*. Invited Poster. Bioreactors. November 1991, Augusta, GA. US Department of Energy, Office of Environmental Restoration Technology Information Exchange Workshop.
826. **Hazen, T. C.** Invited Seminar. Bioremediation at SRS. November 1991, Atlanta, GA. Annual Meeting of the Southeastern Society for Microbiology.
827. Mills\*, G. L., T. Savage, T. Hall, and **T. C. Hazen**. Contributed. Characterization of Diesel Oil Components in a Shallow Aquifer Contaminant Plume. November 1991, Washington, DC. Annual meeting of the Society of Environmental Toxicology and Contamination.
828. Hall\*, T., T. Savage, G. L. Mills, and **T. C. Hazen**. Contributed. Determination of petroleum hydrocarbons in a contaminated shallow aquifer using chromarodiatroscan TLC-FID. November 1991, Washington, DC. Annual meeting of the Society of Environmental Toxicology and Contamination.
829. **Hazen, T. C.** Invited Seminar. Bioremediation of SRS waste sites. October 1991, Pensacola, FL. Department of Biology, University of West Florida.
830. **Hazen, T. C.** Invited Keynote Speaker. Bioremediation/Biotechnology. October 1991, San Juan, PR. Puerto Rico Conference on Advanced Technology/ InterAmerican University.
831. **Hazen, T. C.** Invited Seminar. Technology Demonstration at the Miscellaneous Chemical Basin. September 1991, Aiken, SC. Monthly SRS-EPA-SCDHEC Federal Facilities Agreement Meeting.
832. **Hazen, T. C.** Magazine Interview. Bioremediation at SRS: Interview and cover picture "DOE this Month". August 1991, Washington, DC. U. S. Department of Energy.
833. Siler\*, J. L., D. J. McCabe, and **T. C. Hazen**. Contributed. Fouling of ceramic filters and thin-film composite reverse osmosis membranes by inorganics and bacteria. August 1991, Chicago, IL. International Congress on Membranes and Membrane Processes.
834. Siler\*, J. L., D. J. McCabe, and **T. C. Hazen**. Contributed. Fouling of ceramic filters and thin-film composite reverse osmosis membranes by inorganic and bacterial constituents. August 1991, Pittsburgh, PA. Annual meeting of American Institute of Chemical Engineers.
835. **Hazen, T. C.** Invited Seminar. Bioremediation at SRS. July 1991, Cincinnati, OH. U. S. Environmental Protection Agency, Office of Research and Development.
836. **Hazen, T. C.**, and C. B. Fliermans. Invited. Bioremediation Workshop. June 1991, Aiken, SC. WSRC-DOE Environmental Restoration Division.
837. **Hazen, T. C.** Invited. Bioremediation at SRS. June 1991, Washington, DC. DOE-OTD Midyear Program Review.
838. Kaback\*, D. S., B. B. Looney, C. A. Eddy, and **T. C. Hazen**. Contributed. May 1991, Las Vegas, NV. National Water Well Association Outdoor Action Conference.
839. **Hazen, T. C.** Invited Seminar. TCE/PCE Bioremediation at SRS. May 1991, Tucson, AZ. Department of Civil Engineering. University of Arizona.
840. **Hazen, T. C.** Interview. Bioremediation at SRS. March 1991, Aiken, SC. New York Times - Kieth Schnieder.
841. **Hazen, T. C.** Invited Workshop. Outdoor Safety. March 1991, Augusta, GA. Warren Road Elementary School.
842. **Hazen, T. C.** Invited Seminar. Bioremediation of contaminated waste sites at the Savannah River Site. February 1991, Charlottesville, VA. Department of Chemical Engineering, University of Virginia.
843. **Hazen, T. C.** Invited Seminar. Bioremediation of contaminated sites at the Savannah River Site. February 1991, Augusta, GA. Augusta College, University of Georgia.
844. **Hazen, T. C.** Invited Plenary Speaker. Bioremediation: Teaching Bacteria to Destroy Toxic Chemicals in Contaminated Environments or a Natural Solution to Pollution. February 1991, San Juan, PR. Fifteenth Congress of Scientific Investigation, sponsored by InterAmerican University.
845. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. January 1991, Aiken, SC. Savannah River Ecology Laboratory, University of Georgia.
846. **Hazen, T. C.** Invited workshop. Phase 1 biological report and proposed activity of Phase 2 of the DOE Integrated Demonstration of TCE remediation at the Savannah River Site. January 1991, Aiken, SC. Technical meeting of the DOE Integrated Demonstration Project at SRS.
847. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. January 1991, Wilmington, NC. Department of Biology, University of North Carolina at Wilmington.

848. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. January 1991, Chapel Hill, NC. Department of Environmental Engineering and Public Health, University of North Carolina at Chapel Hill.
849. **Hazen, T. C.** Invited Seminar. Bioreactors: a new method for cleaning chemical-contaminated groundwater using soil bacteria. January 1991, Aiken, SC. Meeting of South Carolina Research and University Educational Foundation Steering Committee.
850. **Hazen, T. C.** Invited Seminar. Proposed sOILs Facility for bioremediation of petroleum contaminated soil at the Savannah River Site. December 1990, Columbia, SC. Groundwater Division of the South Carolina Department of Health and Environmental Control.
851. **Hazen, T. C.** Invited Workshop. How clean is clean enough? GRI/IGT Workshop on Environmental Biotechnology. December 1990, New Orleans, LA. Third International IGT Symposium on Gas, Oil, Coal and Environmental Biotechnology.
852. **Hazen, T. C.** Invited Seminar. Phase 1 biological report and proposed activity of Phase 2 of the DOE Integrated Demonstration of TCE remediation at the Savannah River Site. November 1990, Columbia, SC. Groundwater Division of the South Carolina Department of Health and Environmental Control.
853. **Hazen, T. C.** Invited poster: Bioreactors: a new method for cleaning chemical-contaminated groundwater using soil bacteria. November 1990, Aiken, SC. Boy Scout Jamboree of the Central Savannah River Council.
854. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. November 1990, Livermore, CA. Lawrence Livermore National Laboratory.
855. **Hazen, T. C.** Invited Seminar. The SRS sOILs Facility, a petroleum contaminated soil bioremediation facility. October 1990, Augusta, GA. Quarterly meeting of the Region 4 EPA/SCDHEC/SRS.
856. **Hazen, T. C.** Invited Seminar. The potential for bioremediation of PCBs in soil. October 1990, Aiken, SC. Workshop of the Westinghouse Electric Bloomington Project.
857. **Hazen, T. C.** Videotape Interview. Phase 2 of the Integrated Demonstration Program for bioremediation of trichloroethylene in groundwater. October 1990, Aiken, SC. WSRC Video Services Tape.
858. **Hazen, T. C.** Invited Seminar. Bioreactors for the degradation of trichloroethylene in groundwater. August 1990, Aiken, SC. DOE Office of Technology Development Integrated Demonstration Meeting for Program Managers.
859. **Hazen, T. C.**, and C. Wolf. TV Interview. Innovative Technologies at SRS for Environmental Cleanup. July 23 1990, Augusta, GA. Invited Guest on Top of the Day Show, 12-12:30, channel 26 WAGT.
860. **Hazen, T. C.** Invited Seminar. Environmental Biotechnology at SRS. July 1990, Aiken, SC. Scientific Ecology Group, Division of Westinghouse Electric Company.
861. **Hazen, T. C.** Invited Seminar. Environmental Biotechnology at SRS. June 1990, Aiken, SC. Geotechnical Advisory Committee meeting of the Savannah River Laboratory, Westinghouse Savannah River Company.
862. **Hazen, T. C.** Invited Seminar. Biotechnology as a Career. June 1990, Aiken, SC. NSF-Ruth Patrick Science Center Summer High School Scholar Program.
863. **Hazen, T. C.** Invited Seminar. Methanotrophic Degradation of Trichloroethylene at SRS. June 1990, Chicago, IL. Annual program review Gas Research Institute and Savannah River Laboratory.
864. **Hazen, T. C.** Invited Seminar. Environmental Biotechnology at SRS. June 1990, Aiken, SC. Semi-Annual meeting of the Westinghouse Savannah River Company Board of Directors.
865. **Hazen, T. C.** Newspaper Article. SRS worker honored for research. Friday May 11 1990, Augusta, GA. The Augusta Chronicle pg 18A
866. **Hazen, T. C.** Newspaper Article. SRL's Dr. Terry Hazen to receive Gold Corporate George Westinghouse Signature Award of Excellence. May 3 1990, Aiken, SC. SRS NEWS pg 3.
867. King\*, D. L., J. E. Wear, and **T. C. Hazen**. Contributed. Chemotactic Behavior of Soil Bacteria to Benzene, Toluene and Xylene. May 1990, Anaheim, CA. Annual meeting of the American Society for Microbiology.
868. Wear\*, J. E., and **T. C. Hazen**. Contributed. Distribution and Abundance of Bacteria from Pristine and Trichloroethylene Contaminated Groundwater. May 1990, Anaheim, CA. Annual meeting of the American Society for Microbiology.
869. **Hazen, T. C.** Invited Seminar. International Symposium on Environmental Biotechnology. April 1990, Braunschweig, West Germany. EERO - GBF International Symposium Environmental Biotechnology.
870. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. April 1990, Idaho Falls, ID. DOE Review of Environmental Biotechnology.
871. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. March 1990, Nashville, TN. Department of Environmental Engineering, Vanderbilt University
872. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. March 1990, Logan, UT. Department of Environmental Engineering, Utah State University
873. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. March 1990, Idaho Falls, ID. Idaho National Engineering Laboratory, EG&G.

874. **Hazen, T. C.** Invited Seminar. Survival of indicators and pathogens in tropical waters. March 1990, Melbourne, FL. Department of Biological Sciences, Florida Institute of Technology.
875. **Hazen, T. C.** Invited Seminar. Bioremediation of toxic waste sites at the Savannah River Site. February 1990, Washington, DC. U. S. Environmental Protection Agency Headquarters, EPA-DOE committee on environmental restoration.
876. **Hazen, T. C.** Invited videotape. Remediation of groundwater using biological methods. February 1990, Washington, DC. U. S. Department of Energy, SciTech RDDT&E prioritization.
877. **Hazen, T. C.** Invited Seminar. Microbiology of the Deep Terrestrial Subsurface. February 1990, Athens, GA. Department of Microbiology, University of Georgia.
878. **Hazen, T. C.** Invited Seminar. Bioremediation, a natural solution to pollution. February 1990, Athens, GA. Department of Microbiology, University of Georgia.
879. **Hazen, T. C.** Invited Seminar. HAZWRAP research/demonstration in TCE bioremediation at the Savannah River Site. February 1990, Atlanta, GA. U. S. Department of Energy (HAZWRAP) and U. S. Air Force Technology Transfer Symposium.
880. **Hazen, T. C.** Invited Seminar. Bioremediation at DOE sites, cooperative research programs. January 1990, Oak Ridge, TN. U. S. Department of Energy and U. S. Environmental Protection Agency Workshop.
881. Jiménez, L., G. López de Victoria, J. Wear, C. B. Fliermans, and **T. C. Hazen**. Contributed. Molecular analysis of deep subsurface bacteria. January 1990, Orlando, FL. International Symposium on Microbiology of the Deep Terrestrial Subsurface.
882. **Hazen, T. C.**, L. Jiménez, and S. Piffner. Contributed. Isolation of microbial DNA from groundwater environments. January 1990, Orlando, FL. International Symposium on Microbiology of the Deep Terrestrial Subsurface.
883. **Hazen, T. C.** Invited Seminar. Deep subsurface bacterial responses to contaminants. January 1990, Orlando, FL. International Symposium on Microbiology of the Deep Terrestrial Subsurface.
884. **Hazen, T. C.** Co-Convener. Contaminated Environments, Plenary Session 7. January 1990, Orlando, FL. International Symposium on Microbiology of the Deep Terrestrial Subsurface.
885. **Hazen, T. C.** Co-Chairman and Co-Organizer. International Symposium on Microbiology of the Deep Terrestrial Subsurface. January 1990, Orlando, FL. Westinghouse Savannah River Company and U. S. Department of Energy.
886. **Hazen, T. C.** Invited Seminar. Bioremediation to toxic waste sites at Savannah River Site. December 1989, New Orleans, LA. Second International Symposium on gas, oil, and coal biotechnology, Institute of Gas Technology.
887. **Hazen, T. C.** Invited Seminar. Bioremediation, a natural solution to pollution. December 1989, Augusta, GA. Central Savannah River Area Sigma Xi Chapter.
888. **Hazen, T. C.** Invited Seminar. SRL-GRI cooperative R and D for demonstration of a methanotrophic bioreactor for degradation of TCE and PCE in groundwater. October 1989, Chicago, IL. Annual meeting of investigators in the Biotechnology Program of the Gas Research Institute.
889. **Hazen, T. C.** Invited Seminar. Microbiology of the Deep Terrestrial Subsurface. October 1989, Charlotte, NC. Department of Biology, University of North Carolina at Charlotte.
890. **Hazen, T. C.** Invited Seminar. Microbiology of the Deep Terrestrial Subsurface. September 1989, Dayton, OH. Department of Biology, University of Dayton.
891. **Hazen, T. C.** Newspaper Article. SRL researcher on the go by Sherley S. Bonner. September 1989, Aiken, SC. SRS News
892. **Hazen, T. C.** Invited Seminar. Survival and Activity of Indicators and Pathogens in Water. August 1989, Charleston, SC. National Marine Fisheries Laboratory of Charleston.
893. **Hazen, T. C.** Invited Convener. Symposium: Deep Terrestrial Subsurface Microbiology. August 1989, Seattle, Washington. Annual meeting of the American Society of Industrial Microbiologists.
894. **Hazen, T. C.** Invited Participant and Speaker. Colloquia: Indicators and Pathogens in Tropical Waters. July 1989, Townsville, Australia. International Colloquia on Water Quality in the Humid Tropics UNESCO
895. **Hazen, T. C.** Invited Seminar. What do Fecal Coliforms Indicate in Tropical Waters? July 1989, Honolulu, HI. Water Resources Institute, University of Hawaii.
896. **Hazen, T. C.** Invited Seminar. Deep Terrestrial Subsurface Microbiology. July 1989, Honolulu, HI. Department of Microbiology, University of Hawaii.
897. **Hazen, T. C.** Invited Seminar. Biotechnology as a Career. June 1989, Aiken, SC. Ruth Patrick Science Center, Summer Students.
898. **Hazen, T. C.** Invited Seminar. Ethics of Genetic Engineering. June 1989, Aiken, SC. Ruth Patrick Science Center, Summer Students.
899. **Hazen, T. C.** Work Review. Central Shops Diesel Storage Facility Bioremediation Feasibility Status Report. June 1989, Aiken, SC. Savannah River Laboratory.

900. **Hazen, T. C.** Invited Seminar. Microbiology of the Deep Terrestrial Subsurface. June 1989, Columbia, SC. South Carolina Water Resources Commission.
901. **Hazen, T. C.** Invited. Central Shops Diesel Storage Facility Bioremediation Feasibility Status Report. June 1989, Aiken, SC. DOE Groundwater Update. Savannah River Laboratory.
902. López de Victoria\*, L., L. Jiménez, **T. C. Hazen**, and C. B. Fliermans. Contributed. Chemotactic behavior of deep terrestrial subsurface bacteria. May 1989, New Orleans, LA. Annual meeting of the American Society for Microbiology.
903. Jiménez\*, L., G. López de Victoria, **T. C. Hazen**, and C. B. Fliermans. Contributed. Molecular characterization of heterotrophic bacterial communities from deep terrestrial subsurface environments. May 1989, New Orleans, LA. Annual meeting of the American Society for Microbiology.
904. Soto\*, J. M., and **T. C. Hazen**. Contributed. Total coliforms, fecal coliforms, and fecal streptococci as indicators of Public water supply quality in the tropics. May 1989, New Orleans, LA. Annual meeting of the American Society for Microbiology.
905. **Hazen, T. C.** Television Interview. Biodegradation of Trichloroethylene. May 1989, New Orleans, LA. Invited Guest. ASM update Annual meeting of the American Society for Microbiology.
906. **Hazen, T. C.** Symposium Convener: Biodegradation of Trichloroethylene. May 1989, New Orleans, LA. Annual meeting of the American Society for Microbiology.
907. **Hazen, T. C.** Symposium Convener. Indicators and Pathogens in Tropical Waters. May 1989, New Orleans, LA. Annual meeting of the American Society for Microbiology.
908. **Hazen, T. C.** Invited Seminar. Microbiology of the Deep Terrestrial Subsurface. April 1989, Atlanta, GA. Department of Biology, Georgia State University.
909. **Hazen, T. C.** Invited Seminar. Bioremediation of Toxic Waste Sites. April 1989, Atlanta, GA. Department of Biology, Georgia Institute of Technology.
910. **Hazen, T. C.** Invited Seminar. Bioremediation of Toxic Waste Sites. March 1989, Davidson, NC. Department of Biology, Davidson College.
911. **Hazen, T. C.** Invited Seminar. Bioremediation of Toxic Waste Sites. February 1989, San Juan, PR. Sigma Xi of Puerto Rico.
912. **Hazen, T. C.** Contributed. Deep Probe investigators meeting progress. January 1989, Tallahassee, FL. U. S. Department of Energy and Florida State University.
913. Fliermans\*, C. B., H. W. Bledsoe, L. Jiménez, **T. C. Hazen**, T. J. Phelps, and F. J. Wobber. Contributed. Microbiology and geological comparisons of the terrestrial deep subsurface. December 1988, San Francisco, CA. Annual meeting of the American Geophysical Union.
914. **Hazen, T. C.**, L. Jiménez, G. López de Victoria, and C. B. Fliermans. Contributed. Comparison of Bacteria from Water and Sediment Cores in the Terrestrial Subsurface. December 1988, Washington, DC. Annual meeting of the Hazardous Materials Control Research Institute.
915. **Hazen, T. C.** Videotape Interview. Life in the deep terrestrial subsurface. November 1988, Aiken, SC. SRP Update. DuPont Video Services Tape 810-1319.
916. **Hazen, T. C.** Invited Seminar. Life in the deep terrestrial subsurface. October 1988, Troy, NY. Rennsalaer Polytechnic Institute.
917. **Hazen, T. C.**, C. B. Fliermans, T. Phelps, and T. Griffin. Radio Interview. Life in the deep terrestrial subsurface. October 1988, NY. Invited Guest on All Things Considered. National Public Radio.
918. **Hazen, T. C.** Invited Seminar. Survival of indicators and pathogens in natural environments. September 1988, Bozeman, MT. Northwest regional meeting of the American Society of Microbiology.
919. **Hazen, T. C.** Invited Convener. Indicators in Tropical Waters. August 1988, Banff, Alberta, Canada. First Biennial Symposium on Water Quality.
920. Bermúdez, M., and **T. C. Hazen**. Contributed. Phenotypic and genotypic comparison of *Escherichia coli* from pristine tropical waters. May 1988, Miami, FL. Annual meeting of the American Society for Microbiology.
921. López de Victoria, G., L. Jiménez, I. Muñiz, **T. C. Hazen**, and C. B. Fliermans. Contributed. Comparison of Bacteria from Water and Sediment Cores in the Terrestrial Subsurface. May 1988, Miami, FL. Annual meeting of the American Society for Microbiology.
922. Jiménez, L., I. Muñiz, and **T. C. Hazen**. Contributed. Survival and Activity of Salmonella typhimurium and *Escherichia coli* in Tropical Freshwater. May 1988, Miami, FL. Annual meeting of the American Society for Microbiology.
923. **Hazen, T. C.** Invited Seminar. What do Fecal Coliforms Indicate in Tropical Waters? February 1988, Winston-Salem, NC. Wake Forest University.
924. **Hazen, T. C.** Radio Interview. Survival of Fecal Coliforms in seawater, implications for the Scarborough, England outfall. February 12, 1988, Yorkshire, England. Yorkshire British Broadcast Company Station.

925. **Hazen, T. C.** Invited Seminar. Life in the deep terrestrial subsurface. December 1987, San Juan, PR. Sigma Xi Club of San Juan.
926. **Hazen, T. C.** Invited Workshop. Computer Data Acquisition and Transfer, Modem and Instrument Interfacing. March 1987, San Juan, PR. Compu-Campus IV - Turabo University.
927. Rivera, S., T. Lugo, and **T. C. Hazen.** Contributed. Autecology of *Vibrio vulnificus* and *Vibrio parahaemolyticus* in tropical waters. March 1987, Atlanta, GA. Annual meeting of the American Society for Microbiology.
928. Rojas, Y. A., I. Muñiz, and **T. C. Hazen.** Contributed. Survival of *Vibrio cholerae* in treated and untreated rum distillery effluents. March 1987, Atlanta, GA. Annual meeting of the American Society for Microbiology.
929. Negrón, A., I. Pérez, and **T. C. Hazen.** Contributed. Isolation of *Legionella* species from cooling towers in the tropics. March 1987, Atlanta, GA. Annual meeting of the American Society for Microbiology.
930. Jiménez, L., W. E. Arias, T. Lugo, and **T. C. Hazen.** Contributed. Densities and physiological activity of planktonic and epilithic bacteria in tropical freshwater environments. March 1987, Atlanta, GA. Annual meeting of the American Society for Microbiology.
931. Santo Domingo, J., F. A. Fuentes, and **T. C. Hazen.** Contributed. Comparison of the in situ survival rates and activity of *Escherichia coli* and *Streptococcus faecalis* in tropical marine waters. March 1987, Atlanta, GA. Annual meeting of the American Society for Microbiology.
932. **Hazen, T. C.** Invited Seminar. Microbial indicators of water quality: Reassessing the standards. February 1987, Aiken, SC. Savannah River Laboratory, DuPont.
933. **Hazen, T. C.,** G. A. Toranzos, and L. Jiménez. Invited Seminar. Workshop on detecting *Salmonella* spp. in the environment. February 1987, Dorado, PR. Puerto Rico Department of Health.
934. **Hazen, T. C.** Invited Seminar. Computer usage in the laboratory, a faculty workshop. January 1987, Santurce, PR. Sacred Heart University MBS Program.
935. **Hazen, T. C.** Invited Seminar. Water quality in Puerto Rico. November 1986, Río Piedras, PR. BetaBetaBeta, Biology Week, University of Puerto Rico.
936. **Hazen, T. C.** Invited Seminar. Computer use in the sciences. November 1986, Santurce, PR. Honor Students Symposium, Sacred Heart University.
937. **Hazen, T. C.** Invited Seminar. Drinking water microbiology. October 1986, Humacao, PR. Puerto Rico Society of Microbiologists.
938. Television Interview: Tropical Water Quality Research in Puerto Rico. October 1986, Atlanta, GA. Invited Guest on Science and Technology Reports. CNN News.
939. Arias, W. E., and **T. C. Hazen.** Contributed. Epilithic communities in a tropical rain forest watershed. August 1986, Ljubljana, Yugoslavia. Fourth International Symposium on Microbial Ecology.
940. **Hazen, T. C.** Invited Convener. Human Pathogens in the Environment. August 1986, Ljubljana, Yugoslavia. Fourth International Symposium on Microbial Ecology.
941. **Hazen, T. C.** Invited Seminar. Survival and distribution of pathogens in tropical marine waters and seafood. June 1986, Parguera, PR. Regional AAAS Symposium "Marine Industries: Promising Future to Old and New Ventures."
942. **Hazen, T. C.** Invited Seminar. Pathogens and their indicators in the waters and shellfish of Puerto Rico. May 1986, San Juan, PR. Natural History Society of Puerto Rico.
943. **Hazen, T. C.** Newspaper Article. Biologist: cleanup may not cut freshwater bacteria by Rolf Olsen, Interview and picture. Monday June 2 1986, San Juan, PR. The San Juan Star page 2.
944. **Hazen, T. C.** Invited Seminar. Microbial Ecology of Tropical Waters. May 1986, Mayagüez, PR. Industrial Microbiology Symposium, University of Puerto Rico.
945. **Hazen, T. C.** Invited Seminar. Genetically - Engineered Microbes in the Environment. May 1986, Río Piedras, PR. BetaBetaBeta, Biology Week, University of Puerto Rico.
946. **Hazen, T. C.** Invited Instructor. Genetically - Engineered Bacteria in the Environment. April 1986, Río Piedras, PR. Special Topics in Modern Biology, University of Puerto Rico.
947. Gómez, E., Y. A. Rojas, and **T. C. Hazen.** Contributed. Distribution of *Vibrio cholerae* in rum effluents. April 1986, Río Piedras, PR. Annual Junior Technical meeting of the American Chemical Society of Puerto Rico.
948. Rojas, Y. A., and **T. C. Hazen.** Contributed. Bacterial communities from treated and untreated rum distillery effluents. April 1986, Río Piedras, PR. Annual Junior Technical meeting of the American Chemical Society of Puerto Rico.
949. **Hazen, T. C.** Invited Seminar. Survival and activity of pathogens and their indicators in tropical waters. April 1986, Humacao, PR. Marine Science Program, Humacao University.
950. **Hazen, T. C.** Invited Instructor. Microbial Ecology of Tropical Waters. April 9-11 1986, San Juan, PR. Chautauqua Short Course, NSF - Chautauqua Field Centers.
951. López de Cardona, I., M. Bermúdez\*, and **T. C. Hazen.** Contributed. Survival of poliovirus in a tropical lagoon. March 1986, Washington, DC. Annual meeting of the American Society for Microbiology.

952. Rojas, Y. A., A. Negrón, W. Arias, and **T. C. Hazen**. Contributed. Characterization of bacterial communities from treated and untreated rum distillery effluents. March 1986, Washington, DC. Annual meeting of the American Society for Microbiology.
953. **Hazen, T. C.** Invited Seminar. Genetically - Engineered Bacteria in the Environment. February 1986, Río Piedras, PR. University Honors Program, University of Puerto Rico.
954. **Hazen, T. C.** Invited Seminar. Aquatic Microbial Ecology. January 1986, San Juan, PR. School of Medicine, University of Puerto Rico.
955. López de Cardona, I., M. Bermúdez\*, and **T. C. Hazen**. Contributed. Survival of poliovirus in a tropical lagoon. December 1985, San Juan, PR. Semi-annual meeting of the Puerto Rico Society of Microbiologists.
956. Santiago\*, J., and **T. C. Hazen**. Contributed. Comparison of four membrane filter methods and MPN for enumeration of fecal coliforms in tropical waters. December 1985, San Juan, PR. Semi-annual meeting of the Puerto Rico Society of Microbiologists.
957. Santo-Domingo\*, J., F. Fuentes, and **T. C. Hazen**. Contributed. Survival and activity of *Streptococcus faecalis* and *Escherichia coli* in near-shore marine waters receiving petroleum effluent. December 1985, San Juan, PR. Semi-annual meeting of the Puerto Rico Society of Microbiologists.
958. **Hazen, T. C.** Invited Seminar. Survival and activity of pathogens and their indicators in tropical waters. October 1985, Cayey, PR. Department of Physiology, Cayey School of Medicine.
959. **Hazen, T. C.** Convener. Water Microbiology. October 1985, San Juan, PR. Puerto Rico Society of Microbiologists.
960. **Hazen, T. C.** Invited Seminar. Survival and activity of coliforms in tropical waters. October 1985, San Juan, PR. Department of Biochemistry, University of Puerto Rico, School of Medicine.
961. **Hazen, T. C.** Convener. Data Management and Analysis in Microbiology. October 1985, Río Piedras, PR. Puerto Rico Society of Microbiologists.
962. **Hazen, T. C.** Invited Seminar. Survival and activity of pathogens and their indicators in tropical environments. September 1985, Aiken, SC. Savannah River Ecology Laboratory, University of Georgia.
963. **Hazen, T. C.** Faculty Invited Seminar. Workshop on Computer-Assisted-Instruction in Biology. August 1985, San Juan, PR. InterAmerican University.
964. Fuentes\*, F. A., and **T. C. Hazen**. Contributed. Petroleum biodegradation in tropical near-shore coastal waters receiving the effluents from a petroleum refinery. June 1985, Río Grande, PR. Annual meeting of the Puerto Rico Society for Microbiology.
965. Arias\*, W. E., and **T. C. Hazen**. Contributed. Epilithic communities in a tropical rain forest watershed. June 1985, Río Grande, PR. Annual meeting of the Puerto Rico Society for Microbiology.
966. Elías-Maldonado\*, E., and **T. C. Hazen**. Contributed. Screening of a fluorescent antibody for the presumptive detection and identification of *Yersinia enterocolitica*. June 1985, Río Grande, PR. Annual meeting of the Puerto Rico Society for Microbiology.
967. **Hazen, T. C.** Newspaper Article. "Ojo con los ostiones cantaminado en Boqeron by Clarence Beardsley. Sunday June 16 1985, San Juan, PR. El Mundo.
968. **Hazen, T. C.** Invited Seminar. I got it, now what do I do with it? - A seminar on statistical decisions. June 1985, San Juan, PR. Annual meeting of the Puerto Rico Society for Microbiology.
969. Fuentes\*, F. A., and **T. C. Hazen**. Contributed. Petroleum biodegradation in tropical near-shore coastal waters receiving the effluents from a petroleum refinery. March 1985, Las Vegas, NV. Annual meeting of the American Society for Microbiology.
970. Arias\*, W. E., and **T. C. Hazen**. Contributed. Epilithic communities in a tropical rain forest watershed. March 1985, Las Vegas, NV. Annual meeting of the American Society for Microbiology.
971. Elías-Maldonado, E., and **T. C. Hazen\***. Contributed. Screening of a fluorescent antibody for the presumptive detection and identification of *Yersinia enterocolitica*. March 1985, Las Vegas, NV. Annual meeting of the American Society for Microbiology.
972. **Hazen, T. C.** Invited Seminar. The ecology of *Aeromonas hydrophila* and disease in fish and alligators. February 1985, Tucson, AZ. University of Arizona.
973. **Hazen, T. C.** Invited Seminar. Microbiological pollution of the environment. February 1985, San Juan, PR. School of Medicine, University of Puerto Rico.
974. **Hazen, T. C.** Invited Seminar. Aquatic Microbial Ecology. January 1985, San Juan, PR. School of Medicine, University of Puerto Rico.
975. **Hazen, T. C.** Invited Seminar. Workshop on computer programming and applications for faculty. December 1984, Río Piedras, PR. Resource Center for Science and Engineering.
976. **Hazen, T. C.** Invited Seminar. Workshop on Computer-assisted-instruction modules for biology. September 1984, San Juan, PR. InterAmerican University.
977. **Hazen, T. C.** Invited Seminar. Seminar on how to do biological research (methods and funding). September 1984, Río Piedras, PR. InterAmerican University.

978. **Hazen, T. C.** Invited Seminar. El uso de la microcomputadora. August 1984, Río Piedras, PR. Honors Program, University of Puerto Rico.
979. **Hazen, T. C.** Invited: Workshop on computer programming and applications for faculty. May 1984, Río Piedras, PR. Resource Center for Science and Engineering.
980. López, I., M. Bermúdez\*, L. Almodovar, E. Medina, and **T. C. Hazen.** Contributed. Enteroviruses from a tropical lagoon. April 1984, Río Piedras, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
981. Santiago\*, J., and **T. C. Hazen.** Contributed. Comparison of four membrane filter methods and MPN for enumeration of fecal coliforms in tropical waters. April 1984, Río Piedras, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
982. Elías de Maldonado\*, E. E., and **T. C. Hazen.** Contributed. Sobrevivencia y actividad de *Yersinia enterocolitica* en la cuenca de un bosque tropical. April 1984, Río Piedras, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
983. **Hazen, T. C.** Invited Seminar. Environmental Microbiology. April 1984, Cidra, PR. Millipore Corp. and the Puerto Rico Society for Microbiology.
984. **Hazen, T. C.** Invited Seminar. How to become a scientist and environmental microbiology. March 1984, Walled Lake, MI. Walled Lake Central High School.
985. **Hazen, T. C.** Invited Seminar. The ecology of *Aeromonas hydrophila* and red-sore disease in the southeastern United States. March 1984, Rochester, MI. Oakland University.
986. Santiago\*, J., **T. C. Hazen,** and N. Pérez-Rosas. Contributed. Comparison of four membrane filter methods and MPN for fecal coliforms in tropical waters. March 1984, St. Louis, MO. Annual meeting of the American Society for Microbiology.
987. López de Cardona\*, I., M. Bermúdez, L. Almodovar, E. Medina, and **T. C. Hazen.** Contributed. Enteroviruses in shellfish from a tropical lagoon. March 1984, St. Louis, MO. Annual meeting of the American Society for Microbiology.
988. Carrillo\*, M., E. Estrada, and **T. C. Hazen.** Contributed. Evaluation of *Bifidobacteria* as a potential indicator of human fecal contamination in tropical freshwater. March 1984, St. Louis, MO. Annual meeting of the American Society for Microbiology.
989. Elías-Maldonado\*, E., and **T. C. Hazen.** Contributed. Survival and activity of *Yersinia enterocolitica* in a tropical rain forest watershed. March 1984, St. Louis, MO. Annual meeting of the American Society for Microbiology.
990. Fuentes\*, F. A., and **T. C. Hazen.** Contributed. Diauxic growth of *Pseudomonas aeruginosa* PRG-1 on glucose and benzothiofene. March 1984, St. Louis, MO. Annual meeting of the American Society for Microbiology.
991. **Hazen, T. C.** Invited Seminar. Microbiological pollution of the environment. February 1984, San Juan, PR. School of Medicine, University of Puerto Rico.
992. **Hazen, T. C.** Invited Seminar. Biogeochemical cycling. February 1984, San Juan, PR. School of Medicine, University of Puerto Rico.
993. **Hazen, T. C.** Invited Seminar. Microbiological water quality in Puerto Rico. January 1984, Ponce, PR. Catholic University of Puerto Rico.
994. Esch\*, G. W., and **T. C. Hazen.** Contributed. Long-term study of *Crepidostomum cooperi* in the burrowing mayfly, *Hexagenia limbata*. December 1983, San Antonio, TX. Annual meeting of the American Society of Parasitologists.
995. **Hazen, T. C.** Invited Moderator. Non-fermentative gram-negative bacilli. November 1983, Río Piedras, PR. Puerto Rico Society for Microbiology Workshop.
996. **Hazen, T. C.** Invited workshop. Microcomputers documentation in general: statistical analysis, graphics, budgeting, etc. October 20 & 21 1983, Isla Verde, PR. Annual Chemical Conference of the Puerto Rico Chemists Association.
997. **Hazen, T. C.** Invited. Round Table discussion on: Nature as a reservoir of animal pathogens. August 1983, East Lansing, MI. Third International Symposium on Microbial Ecology.
998. **Hazen, T. C.** Contributed. A comparison of in situ survival and activity of four enteric bacteria and one yeast in tropical marine and freshwaters with special attention to the effects of water quality. August 1983, East Lansing, MI. Third International Symposium on Microbial Ecology.
999. **Hazen, T. C.** Invited Seminar. Stress, antibodies and disease in natural populations of largemouth bass. August 1983, Houghton, MI. Michigan Technological University.
1000. **Hazen, T. C.** Invited Seminar. Statistics in research investigation. July 1983, Río Piedras, PR. Workshop for High School Science Teachers.
1001. **Hazen, T. C.** Invited Seminar. Statistics in research investigation. June 1983, Río Piedras, PR. Workshop for High School Science Teachers.

1002. **Hazen, T. C.** Invited Workshop. Microcomputers in the laboratory. June 1983, Dorado, PR. Colegio de Quimicos de Puerto Rico.
1003. Pérez-Rosas\*, N. and **T. C. Hazen.** Contributed. Isolation and survival of *Vibrio* spp. in tropical aquatic environments. April 1983, Ponce, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1004. Fuentes\*, F. A., E. Bíamon, and **T. C. Hazen.** Contributed. Bacterial chemotactic response towards mostos. April 1983, Ponce, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1005. Estrada\*, E., and **T. C. Hazen.** Contributed. Survival and activity of *Aeromonas hydrophila* in sediments. April 1983, Ponce, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1006. Elías\*, E. E., and **T. C. Hazen.** Contributed. *Yersinia enterocolitica* en aguas tropicales. April 1983, Ponce, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1007. Carrillo\*, M., and **T. C. Hazen.** Contributed. *Bifidobacterium* as an indicator of human fecal contamination in tropical freshwaters. June 1983, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1008. Carrillo\*, M., and **T. C. Hazen.** Contributed. *Bifidobacterium* as an indicator of human fecal contamination in tropical freshwaters. April 1983, Ponce, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1009. **Hazen, T. C.** Invited Seminar. Stress, body condition, antibodies and disease in natural populations of largemouth bass. April 1983, Champaign, IL. Illinois Natural History Survey (University of Illinois)
1010. **Hazen, T. C.** Invited Workshop. Enumerating and identifying *Aeromonads* from water and fish. April 1983, Indianapolis, IN. Eighth Annual Assoc. Official Analytical Chemists Spring Workshop.
1011. **Hazen, T. C.** Invited Seminar. Microcomputer applications in Biology. April 1983, San Juan, PR. InterAmerican University.
1012. Fuentes\*, F. A., and **T. C. Hazen.** Contributed. Bacterial chemotactic responses towards mostos. March 1983, New Orleans, LA. American Society for Microbiology annual meeting.
1013. López-Torres\*, A. J., and **T. C. Hazen.** Contributed. Density, distribution and abundance of *Klebsiella pneumoniae* in a tropical rain forest watershed. March 1983, New Orleans, LA. American Society for Microbiology annual meeting.
1014. Valdés-Collazo\*, L., **T. C. Hazen,** and A. J. Schultz. Contributed. Survival and distribution of *Candida albicans* in tropical waters. March 1983, New Orleans, LA. American Society for Microbiology annual meeting.
1015. **Hazen, T. C.** Invited Symposium. In situ diffusion chamber studies of bacteria and yeast in tropical environments. March 1983, New Orleans, LA. American Society for Microbiology annual meeting.
1016. Ortiz-Roque\*, C. and **T. C. Hazen.** Contributed. Aislacion de *Legionella pneumophila* de aguas tropicales. December 1982, San Juan, PR. Primero Congreso Estudiantil de Investigacion Cientifica.
1017. López-Torres\*, A. J., and **T. C. Hazen.** Contributed. In situ survival of *Klebsiella pneumoniae* in tropical waters. June 1982, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1018. Valdés-Collazo\*, L., **T. C. Hazen,** and A. J. Schultz. Contributed. Distribution and survival of *Candida albicans* in tropical freshwater. June 1982, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1019. Fuentes\*, F. A., C. L. Fuentes, E. J. Bíamon, and **T. C. Hazen.** Contributed. Bacterial chemotactic response towards mosto. June 1982, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1020. Joyner\*, S., and **T. C. Hazen.** Contributed. Distribution, abundance and activity of bacteria in bromeliad water from a tropical rain forest. June 1982, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1021. Pérez-Rosas\*, N., and **T. C. Hazen.** Contributed. Isolation and survival of *Vibrio* spp. in tropical aquatic environments. June 1982, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1022. Sastre\*, M. P., G. Candelas, and **T. C. Hazen.** Contributed. The ecology of *Donax denticulatus* in Puerto Rico. June 1982, Raleigh, NC. American Society of Limnology and Oceanography annual meeting.
1023. Aranda\*, C. F., and **T. C. Hazen.** Contributed. A model for zooplankton distribution and abundance in a tropical rain forest stream. June 1982, Raleigh, NC. American Society of Limnology and Oceanography annual meeting.
1024. Medina\*, E. I., and **T. C. Hazen.** Contributed. Water quality and distribution and abundance of shrimp in Camuy River, PR. June 1982, Raleigh, NC. American Society of Limnology and Oceanography annual meeting.
1025. Valdés Collazo\*, L., and **T. C. Hazen.** Contributed. Distribucion y actividad de bacterias en una zona de captacion tropical lluviosa. April 1982, San Juan, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1026. Ortiz-Roque\*, C., and **T. C. Hazen.** Contributed. Isolation of *Legionella pneumophila* from tropical waters. March 1982, Atlanta, GA. American Society for Microbiology annual meeting.
1027. Joyner\*, S., and **T. C. Hazen.** Contributed. Distribution, abundance and activity of bacteria in bromeliad water from a tropical rain forest. March 1982, Atlanta, GA. American Society for Microbiology annual meeting.
1028. Pérez-Rosas\*, N., and **T. C. Hazen.** Contributed. Distribution, survival and activity of *Vibrio* spp. in waters surrounding a tropical coral reef. March 1982, Atlanta, GA. American Society for Microbiology annual meeting.

1029. Valdés-Collazo\*, L., and **T. C. Hazen**. Contributed. Distribution and activity of bacteria in a tropical rain forest watershed. March 1982, Atlanta, GA. American Society for Microbiology annual meeting.
1030. Prieto\*, L., A. J. López-Torres\*, and **T. C. Hazen**. Contributed. In situ survival and activity of *Escherichia coli* and *Klebsiella pneumoniae* in near-shore coastal waters of a tropical mangrove island. March 1982, Atlanta, GA. American Society for Microbiology annual meeting.
1031. **Hazen, T. C.** Invited Seminar. The survival of potentially pathogenic bacteria in tropical marine environments. February 1982, Charlotte Amalie, St. Thomas, VI. College of the Virgin Islands.
1032. **Hazen, T. C.** Contributed. Survival and activity of fecal coliform bacteria in polluted and natural waters of Puerto Rico. December 1981, San Juan, PR. Department of Natural Resources annual symposium, Commonwealth of Puerto Rico.
1033. **Hazen, T. C.** Invited Seminar. Microbial Ecology in Puerto Rico. November 1981, Ponce, PR. BetaBetaBeta of Catholic University of Puerto Rico.
1034. Hazen\*, T. C., C. F. Aranda, and N. Pérez. Contributed. Potentially pathogenic bacteria and water quality in a tropical rain forest watershed. November 1981, San Juan, PR. American Society of Tropical Medicine and Hygiene annual meeting.
1035. **Hazen, T. C.** Invited Seminar. Computer applications in biology. September 1981, Caguas, PR. Turabo College.
1036. **Hazen, T. C.** Invited Seminar. Computer applications in biology. September 1981, Arecibo, Puerto Rico. Arecibo Regional College.
1037. Fuentes\*, F. A., and **T. C. Hazen**. Contributed. Chemotactic response of *Pseudomonas aeruginosa* (PRG-1) to benzothiophene in the presence of an alternative carbon source. June 1981, San Juan, PR. Puerto Rico Society for Microbiology annual meeting.
1038. Aranda\*, C. F., and **T. C. Hazen**. Contributed. La ecología del zooplankton de agua dulce en la cuenca del Río Mameyes. April 1981, Humacao, PR. Tercer Simposio de la Fauna de Puerto Rico.
1039. Aranda\*, C. F., and **T. C. Hazen**. Contributed. The ecology of zooplankton in the Mameyes River watershed. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1040. Medina\*, E. I., and **T. C. Hazen**. Contributed. Shrimp of the Camuy River. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1041. Bíamon\*, E. J., and **T. C. Hazen**. Contributed. Survival and distribution of *Aeromonas hydrophila* in a Puerto Rico estuary receiving rum distillery effluent. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1042. Rivera\*, F. L., and **T. C. Hazen**. Contributed. The synergistic effects of ammonia and temperature on the generation time of *Aeromonas hydrophila*. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1043. Fuentes, F. A., and **T. C. Hazen\***. Contributed. Chemotactic response of *Pseudomonas aeruginosa* (PRG-1) to benzothiophene in the presence of an alternative carbon source. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1044. Sastre\*, M. P., G. Candelas, and **T. C. Hazen**. Contributed. The ecology of *Donax denticulatus* in Puerto Rican beaches. April 1981, Mayagüez, PR. American Chemical Society of Puerto Rico annual junior technical meeting.
1045. **Hazen, T. C.** Invited Seminar. Deterministic models of bacteria density and water quality in temperate and tropical ecosystems. March 1981, Dallas, TX. American Society for Microbiology annual meeting.
1046. Bíamon\*, E. J., and **T. C. Hazen**. Contributed. Survival and distribution of *Aeromonas hydrophila* in a Puerto Rico estuary receiving rum distillery effluent. March 1981, Dallas, TX. American Society for Microbiology annual meeting.
1047. **Hazen, T. C.** Invited Seminar. The survival and distribution of potential bacterial pathogens in natural aquatic systems of Puerto Rico. February 1981, San Juan, PR. Fifth InterAmerican University Symposium of Scientific Research.
1048. **Hazen, T. C.** Invited Seminar. Stress, body condition, antibodies and disease in natural populations of largemouth bass. February 1981, Parguera, PR. Department of Marine Sciences, University of Puerto Rico, Mayagüez.
1049. **Hazen, T. C.** Contributed. The relationship between the distribution and abundance of bacteria and water quality in the Río Mameyes watershed. November 1980, San Juan, PR. Department of Natural Resources annual symposium, Commonwealth of Puerto Rico.
1050. **Hazen, T. C.** Contributed. The ecology of *Aeromonas hydrophila*. September 1980, Coventry, England. Second International Symposium on Microbial Ecology.
1051. **Hazen, T. C.** Invited Seminar. Sampling methods and microbial ecology of the Mameyes River, a tropical rain forest watershed. July 1980, Río Piedras, PR. Forest Service Watershed Improvement Workshop, U. S. Department of Agriculture.

1052. Hazen\*, T. C., G. W. Esch, and W. F. Crawford. Contributed. A model for *Aeromonas hydrophila* distribution and abundance in a North Carolina estuary. May 1980, Miami, FL. American Society for Microbiology annual meeting.
1053. Hazen, T. C. Invited Seminar. The ecology of *Aeromonas hydrophila* in a North Carolina estuary. February 1980, Río Piedras, PR. Department of Biology, University of Puerto Rico.
1054. Hazen, T. C. Invited Seminar. The 'fitting' of natural parasite populations to certain theoretical models. February 1980, Río Piedras, PR. Puerto Rican Society for Microbiology.
1055. Esch\*, G. W., and T. C. Hazen. Invited Symposium. A long-term study of the population biology of *Crepidostomum cooperi* (Trematoda) in the burrowing mayfly, *Hexagenia limbata* (Ephemeroptera). January 1980, San Francisco, CA. American Association for the Advancement of Science annual meeting.
1056. Hazen, T. C. Invited Seminar. The ecology of *Aeromonas hydrophila* in a South Carolina cooling reservoir. June 1979, Boston, MA. Boston College.
1057. Hazen, T. C. Invited Seminar. The ecology of *Aeromonas hydrophila* in a South Carolina cooling reservoir. May 1979, Dayton, OH. University of Dayton.
1058. Hazen\*, T. C., M. L. Raker, G. W. Esch, and R. E. Kuhn. Contributed. Natural agglutinating titers of largemouth bass to *Aeromonas hydrophila*. May 1979, Los Angeles, CA. American Society for Microbiology annual meeting.
1059. Hazen\*, T. C., M. L. Raker, and G. W. Esch. Contributed. Chemotaxis of *Aeromonas hydrophila*. May 1979, Los Angeles, CA. American Society for Microbiology annual meeting.
1060. Hazen, T. C. Invited Seminar. The ecology of *Aeromonas hydrophila* in a South Carolina cooling reservoir. April 1979, Río Piedras, PR. University of Puerto Rico.
1061. Huizinga, H. W., G. W. Esch, and T. C. Hazen\*. Contributed. Histopathology of red-sore disease (*Aeromonas hydrophila*) in thermally stressed largemouth bass (*Micropterus salmoides*). December 1978, Richmond, VA. American Microscopical Society annual meeting.
1062. Hazen, T. C. Contributed. The ecology of the bacterium *Aeromonas hydrophila* in a South Carolina cooling reservoir. August 1978, Athens, GA. Ecological Society of America annual meeting.
1063. Esch\*, G. W., and T. C. Hazen. Contributed. Studies on red-sore disease among largemouth bass in a thermally altered reservoir. August 1978, Fort Collins, CO. Wildlife Disease Association annual meeting.
1064. Gibbons\*, J. W., D. H. Bennett, G. W. Esch, and T. C. Hazen. Contributed. Body condition of largemouth bass in a reservoir receiving heated effluent. November 1977, Augusta, GA. Symposium on Energy and Environmental Stress in Aquatic Systems.
1065. Gorden\*, R. W., T. C. Hazen, A. B. Glassman, G. W. Esch, and C. B. Fliermans. Contributed. Bacterial infections of alligators in thermally altered habitats. November 1977, Augusta, GA. Symposium on Energy and Environmental Stress in Aquatic Systems.
1066. Esch\*, G. W., and T. C. Hazen. Keynote address. Thermal ecology and stress: A case history for red-sore disease in largemouth bass (*Micropterus salmoides*). November 1977, Augusta, GA. Symposium on Energy and Environmental Stress in Aquatic Systems.
1067. Hazen\*, T. C., G. W. Esch, and C. B. Fliermans. Contributed. The distribution of the bacterium *Aeromonas hydrophila* in thermally altered environments. November 1977, Augusta, GA. Symposium on Energy and Environmental Stress in Aquatic Systems.
1068. Fliermans\*, C. B., T. C. Hazen, and M. R. Tansey. Contributed. Distribution of *Aeromonas hydrophila* and other pathogens in a South Carolina reservoir. September 1977, Iowa City, IA. Microbiology of Power Plant Thermal Effluents.
1069. Hazen, T. C., R. P. Hirsch\*, and G. W. Esch. Contributed. Hines and Nicholas revisited: a study of parasite distribution. August 1977, Las Vegas, NV. American Society of Parasitologists annual meeting.
1070. Hazen\*, T. C., G. W. Esch, and C. B. Fliermans. Contributed. Distribution of *Aeromonas hydrophila* in a South Carolina cooling reservoir. May 1977, New Orleans, LA. American Society of Microbiology annual meeting.
1071. Glassman, A. B., C. E. Bennett\*, T. C. Hazen, R. W. Gorden, and C. B. Fliermans. Contributed. Light and electron microscopy of the peripheral blood in *Alligator mississippiensis*. November 1977, Augusta, GA. Symposium on Energy and Environmental Stress in Aquatic Systems.
1072. Glassman, A. B., C. E. Bennett\*, T. C. Hazen, R. W. Gorden, and C. B. Fliermans. Contributed. Light and electron microscopy of the peripheral blood in *Alligator mississippiensis*. April 1977, Savannah, GA. Georgia Academy of Science annual meeting.
1073. Hazen, T. C., J. M. Aho\*, and G. W. Esch. Contributed. Observations on the parasite fauna of the American alligator, *Alligator mississippiensis* in South Carolina. April 1977, Raleigh, NC. Southeastern Society of Parasitologists annual meeting.
1074. Hazen\*, T. C., G. W. Esch, and M. L. Raker. Contributed. Light and electron microscope studies on lesions associated with red-sore disease in largemouth bass. April 1977, Raleigh, NC. Southeastern Society of Parasitologists annual meeting.

1075. Hazen\*, T. C., and G. W. Esch. Contributed. The distribution of *Clinostomum marginatum* metacercaria in the centrarchid fish of a South Carolina cooling reservoir. August 1976, San Antonio, TX. American Society of Parasitologists annual meeting.
1076. Fliermans\*, C. B., R. W. Gorden, **T. C. Hazen**, and G. W. Esch. Contributed. Distribution and survival of *Aeromonas* in a thermally altered lake. May 1976, Atlantic City, NJ. American Society for Microbiology annual meeting.
1077. Bowers\*, G. J., and **T. C. Hazen**. Population biology of various parasites from ranid frogs. November 1975, New Orleans, LA. American Society of Parasitologists annual meeting.
1078. Esch, G. W., **T. C. Hazen\***, and J. W. Gibbons. Invited Seminar. Thermal effluent and the epizootiology of *Epistylis* (Ciliophora, Peritricha). November 1975, New Orleans, LA. American Society of Parasitologists annual meeting.
1079. Esch, G. W., **T. C. Hazen\***, and J. W. Gibbons. Invited Seminar. Thermal effluent and the epizootiology of *Epistylis* (Ciliophora, Peritricha). November 1975, Aiken, SC. Savannah River Ecology Laboratory.
1080. **Hazen, T. C.** Contributed. Some aspects of the population biology of two digenetic trematodes in the amphipod crustacean, *Hyalella azteca*. April 1975, Blacksburg, VA. Southeastern Society of Parasitologists annual meeting.